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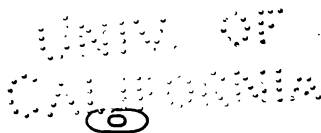


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OUTLINES OF
GENERAL AND SURGICAL
NURSING



BY
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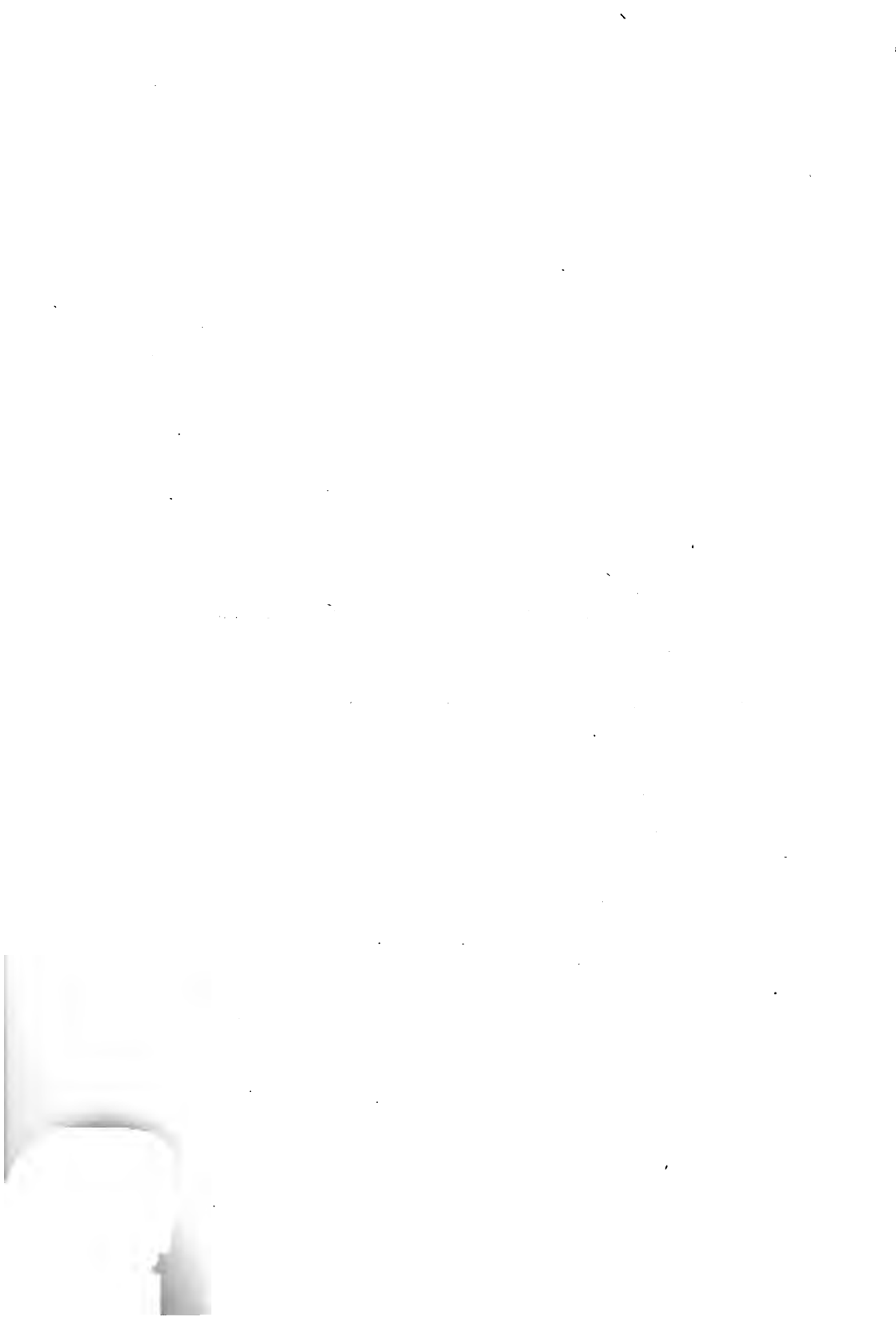


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ABSTRACT

DEDICATED TO MY PUPILS
AT THE
PARADISE VALLEY SANITARIUM TRAINING SCHOOL
FOR
MISSIONARY NURSES



PREFACE



NO ATTEMPT has been made to present in this little book, an exhaustive series of outlines, but to briefly and concisely give the essentials, thus firmly impressing the main principles or skeleton, as it were, of the various subjects. These should be elaborated by the instructor.

Thanks are due Dr. George Knapp Abbott and Dr. Julia A. White of Loma Linda for their many valuable suggestions and criticisms. Also to Dr. Risley of Loma Linda is extended appreciation for the chapter on "Poisons."

W. F. L.

NATIONAL CITY
March, 1912

CONTENTS

PART I

General Nursing

CLINICAL CONDITIONS AND RECORDS. Body Temperature, Pulse, Respiration, Bedside Records.	1—11
THE SICK ROOM. Beds and Bed Making, Personal care of Patient.	12—20
CLINICAL PROCEDURES. Lavage, Test Breakfast, Nasal Douche, Aural Douche, Hypodermic Injections, Catheterization, Nasal Feeding, Nutrient Enema, Poultices, Diet, Administration of Medicines, Examinations, Care of the Dead.	21—40
SPECIAL CONDITIONS AND EMERGENCIES. General Care of Infectious Cases, Bed Sores, Common Emergencies, Poisons.	41—54

PART II

Surgical Nursing

THE PATIENT. Preparation of Patient's Room, Preparation of Patient.	55—75
THE OPERATING ROOM. Technique of Tables, Duties of Staff, Hand Disinfection, Sterilizing Room, Methods of Sterilization, Suggestive Operative Record, Preparation for Operation in Private Home, Anesthetics and Anesthesia.	76—89
SURGICAL AFTER-TREATMENT. Major Operations, Surgical Complications, Special Procedures in Surgical Nursing.	
ACCIDENTS AND MINOR SURGERY. Wounds, Burns, Boils, Ulcers and Abscesses, Hemorrhages, Sprains, Fractures.	90—100

PART III

Solutions

CHEMICALS IN COMMON USE. Corrosive Sublimite, Carbolie Acid, Lysol, Creolin, Formaldehyde, Potassium Permanganate, Boracic Acid, Oxalic Acid, Salt, Alum, Alcohol, Peroxide of Hydrogen, Sodium Bicarbonate, Chloride of Lime, Iodoform, Argvrol.	101—105
THE METRIC SYSTEM.	106
PREPARATION OF SOLUTIONS. Coal Tar Products, Formaldehyde, Bichloride of Mercury, Potassium Permanganate, Boracic Acid, Salt, Cocain.	107—114

PART I

GENERAL NURSING

CLINICAL CONDITIONS AND RECORDS

Body Temperature

The average normal temperature of the body taken by mouth is 98.6° F., but under certain conditions may range between 97.5° and 99.5° and still be considered normal. A temperature above or below these points is abnormal.

The normal variations may be due to various causes, viz,—

1. *Part of body* in which the temperature is taken: Axilla, about 1° F. lower than by mouth. Rectum, about 1° F. higher than by mouth.

2. *The time of day.* In a healthy adult the temperature reaches its highest point between 5 and 8 P. M., and is at its lowest point from 2—6 A. M. In young children and the aged the variations are greater than in adults.

3. *General and local causes, as,—*

a. Age. In infancy the temperature is about 1° F. higher than in adults.

b. Highly seasoned, stimulating foods.

c. Profuse perspiration.

d. Exercise.

e. Water drinking.

f. Fasting.

g. Emotion.

The instrument for registering the bodily heat is called a clinical thermometer. Do not fail to secure a good and reliable thermometer. The best way to test a thermometer is to place it along with one of known accuracy at the same moment, in the mouth or rectum. As thermometers change with age they should be tested frequently.

HOW TO TAKE THE TEMPERATURE

1. *Mouth*.—

- a. Before using, the mercury must be shaken down to a point 2° or 3° below the normal.
- b. Rinse with clean, cold water.
- c. See that the patient has not taken water or food within 20 minutes, as this causes quite a variation.
- d. Place the thermometer under the tongue from 3—5 minutes, the time depending upon the kind of thermometer used.
- e. Do not allow the patient to talk or open the mouth.
- f. Remove, record, and wipe with a piece of cotton wet in water, then disinfect.
- g. It is not safe to take the temperature of children or unconscious persons by mouth as they are liable to bite the bulb and swallow the mercury.

2. *Axilla*.—

- a. Remove clothing from under the arm and dry the skin.
- b. Place the bulb between folds of the skin of the armpit.
- c. Bend the elbow, so that the hand touches the opposite shoulder. Leave in place from 7—10 minutes.
- d. Remove, record, and disinfect.

3. *Rectum*.—

- a. Do not use the same thermometer for the mouth and rectum.
- b. Oil the bulb and insert about 1½ inches.
- c. Leave in place 5 minutes.
- d. Remove, record, and disinfect.

CLASSIFICATION OF TEMPERATURE

Temperature of collapse.....	94°—96° F.
Subnormal temperature.....	96°—98° F.
Normal.....	98.6° with variations
Subfebrile.....	99.5°—100.5° F.
Fever of moderate degree.....	100.5°—103° F.
High fever.....	103°—105° F.
Hyperpyrexia.....	Above 105° F.

A body temperature below 95° or above 109° F., if it persists for any length of time, is likely to be followed by death.

The Fahrenheit scale is the one principally used in America and England, but on the continent of Europe the Centigrade

and Reaumur scales are generally used. To convert Fahrenheit into Centigrade, subtract 32, multiply by 5, and divide by 9.

Example:—

$$104^{\circ} \text{ F.} - 32^{\circ} = 72^{\circ} \text{ F.}$$

$$72^{\circ} \text{ F.} \times 5/9 = 40^{\circ} \text{ C.}$$

To convert Centigrade into Fahrenheit, multiply by 9, divide by 5, and add 32 to the result.

Fever (pyrexia) is an elevation of bodily temperature.

1. *Continuous*. The temperature is uniformly above the normal line, with but slight variations. Example: pneumonia.

2. *Remittent*. The temperature rises and falls, although it never reaches the normal line. Example: typhoid.

3. *Intermittent*. A high temperature which at intervals drops to the normal line, or even below it. Example: tertian malarial fever.

A febrile temperature may fall by *crisis* or *lysis*.

a. *Crisis*. Sudden drop to or below normal (pneumonia).

b. *Lysis*. Gradual decline to (or below) normal (typhoid).

As a general rule the temperature becomes subnormal for several days after a fever.

ITEMS TO BE OBSERVED BY THE NURSE

1. A sudden change in temperature, generally indicates some complication and should be reported to the physician at once.

2. Temperatures should be recorded neatly and accurately. If you have any reason to doubt the accuracy place after the record a (?).

3. Keep thermometers either in their cases with some cotton at the bottom, or in a glass of disinfectant solution with cotton at the bottom.

4. Thermometer disinfectants: Pure carbolic acid, 95% alcohol, formalin, lysol.

Pulse

Every contraction of the heart forces the blood into the arteries, causing a distension of the arterial walls. It is this distension at regular intervals corresponding to the contraction of the heart that is known as the pulse.

Systole. A term used to designate the contraction of the heart.

Diastole. The interval between the contractions, during which the ventricles are filling with blood.

NORMAL PULSE

Men.....	60— 70	beats per minute			
Women.....	65÷ 80	“ “ “			
Children					
New-born	120—140	“ “ “			
1st year	100—120	“ “ “			
2nd “	90—115	“ “ “			
3rd “	80—110	“ “ “			
7th “	72— 90	“ “ “			

HOW TO TAKE THE PULSE

Place two or three fingers (never the thumb) upon the radial artery and count carefully for one minute. When one becomes accustomed to counting the pulse, notice the number of beats for 1/2 minute and then multiply by two. One can also count the pulse easily over the temporal artery and the carotid artery. When taking the pulse the patient should be either sitting or lying—never standing—and should have been quiet for a few minutes preceding.

THINGS WHICH QUICKEN THE PULSE

1. Exercise.
2. Change of position.
3. Food.
4. Emotion.
5. Hot baths.
6. Certain diseases as exophthalmic goiter—in fever the pulse rate increases about ten beats for every degree of rise in temperature.
7. Certain drugs.

THINGS WHICH RETARD THE PULSE

1. Rest.
2. Reclining position.
3. Fasting.
4. Cold to the heart.

5. Certain disease conditions as jaundice and brain tumor.
6. Certain drugs.
7. A large amount of fluid introduced into the system.

The three general attributes of the pulse are *time*, *tension*, and *rhythm*.

1. *Time*—normal, fast, slow. The pulse is faster in children than in adults, and in women than in men. 90—110 frequent. 110—140 rapid. 140 and above very rapid or running.

2. *Tension*—normal, high, low. A high tension pulse is a hard, noncompressible pulse. In hardening of the arteries (arterio-sclerosis) the artery may be rolled under the finger like a cord. A low tension pulse is soft and easily compressible.

3. *Rhythm*. (a) Irregular. The beats differ in length, force, and character. (b) Intermittent. The heart beats regularly for a time, then one beat is so weak as not to be perceptible at the wrist, and it appears as if the beat were lost; or the beat may actually be skipped. The rhythm is otherwise regular.

TERMS USED TO DENOTE CHARACTER OF PULSE

1. *Dicrotic*. A secondary wave in the blood current produced by closure of the aortic valves. Less forcible than first pulse wave, but sometimes resembles it so closely as to be counted as an individual beat. The error becomes apparent by holding one hand on the wrist and the other over the heart. This type of pulse is found frequently in the acute fevers, particularly in typhoid fever.

2. *Water-hammer*. Cause—aortic regurgitation, *i. e.*, the aortic valves are incompetent to close the opening into the aorta so that the pressure is not sustained. The artery suddenly and entirely collapses after each beat.

3. The following terms are self-explanatory: bounding, thready, wiry. A bounding pulse is almost always found in blood-poisoning (septicemia).

A thready pulse indicates extreme weakness of the heart or collapse.

The wiry pulse is present in arterio-sclerosis.

The character of the pulse depends upon,—

1. Action of the heart.

2. Condition of the arteries and capillaries.
3. Amount of blood in the vascular system.

The instrument for recording the pulse tracing is known as a sphygmograph.

The character of the pulse reveals much to the intelligent nurse. A good nurse will improve every opportunity to familiarize herself with the normal pulse and the variations from the normal.

Respiration

Rate in adult, 18 per minute.

Rate in children. Infants, 30—35. At 5th year, 20—25. At 8th year, same as adult.

NORMAL RATIO OF TEMPERATURE, PULSE, AND RESPIRATION

There are four beats of the heart to one respiration. As a rule, every degree of elevation in temperature is accompanied by an increase of ten heart beats.

Respiration consists of, —

1. *Inspiration.* The act of taking air into the lungs.
2. *Expiration.* The act of expelling air from the lungs.

Since one expiration does not entirely empty the lungs, there is always some air in them which is called *residual air*.

The current which is continually passing in and out of the lungs is called *tidal air*.

In counting the respiration one should note, —

1. Frequency.
2. Regular or irregular.
3. Difficult or easy.
4. Noisy or quiet.
5. Deep or shallow.
6. Whether chest expands alike on both sides.
7. Abdominal or thoracic type.

The various types of respiration are, —

1. *Cheyne-Stokes'.* This consists in an increase in the frequency and force of respiration up to a certain point, and then a gradual decrease until the movements entirely cease for a short time, then the whole procedure is repeated. This type may be found in certain diseases of the heart and kidneys.

2. *Stertorous*. A loud snoring sound with each inspiration.
3. *Dyspnœa*. Where the breathing is so difficult that the patient can not lie with the head low.
4. *Orthopnœa*. Where the breathing is so difficult that the patient assumes the upright position.
5. *Mouth Breathing*. Common in children who have chronic congestion of the nasal passages, adenoids, and enlarged tonsils.

The ear should be trained to detect differences in breathing, so that even in the dark, these may be noticed.

In disease there are marked variations in the character of the respiration.

1. Narcotic poisoning, shock, collapse—slow and shallow.
2. Pleurisy, peritonitis—restrained.
3. Cerebral hemorrhage—the cheeks are puffed out with each breath.
4. Peritonitis, pneumonia—very rapid, 40—50 per minute. This is a very grave symptom.

In taking the respiration one must not allow the patient to be aware of it, for he will unconsciously control it. After taking the pulse leave the fingers on the wrist and count the respirations while seeming to count the pulse.

Bedside Records

A bedside record should be a complete picture of the condition of the patient. Its object is to enable the physician to gain accurate information in regard to the state of the patient, and to facilitate a comparison of the condition from day to day.

Neatness, accuracy, and condensation should be observed in making out charts. Enter the items that have a bearing on the case. Do not record non-essentials. Be quick to observe symptoms. These are classified as,—subjective—those things observed by the patient; objective—those things that are observed by others.

In charting, the following abbreviations are much used, and should be memorized by the nurse:—

aa.—equal parts of each.	N.—night.
ad.—up to, to amount to.	No.—number.
ad. lib.—as much as desired.	O.—a pint.
alt. dieb.—every other day.	Ol.—oil.
alt. hor.—every other hour.	Ol. oliv.—olive oil.
alt. noc.—every other night.	Ov.—an egg.
a. c.—before meals.	O. M.—every morning.
Aq.—water.	p. c.—after meals.
Aq. dest.—distilled water.	p. r. n.—as occasion arises or when necessary.
Aq. pur.—pure water.	pulv.—a powder.
b. i. d.—twice daily.	q. s.—a sufficient quantity.
C.—gallon.	qt.—quart.
c. c.—cubic centimeter.	R̄.—take.
Decub.—the lying position.	S. or Sig.—write, <i>i. e.</i> , give the following directions.
Dil.—dilute.	Sol.—solution.
Div.—divide.	Sp. gr.—specific gravity.
℥—dram.	ss.—a half.
Emp.—plaster.	Spr.—spirit.
En.—enema.	Syr.—syrup.
Garg.—a gargle.	T. i. d.—three times a day.
Gr.—grain.	T.—tincture.
Gm.—gram.	Ung.—ointment.
Gtt.—a drop.	℥.—ounce.
Inf.—infusion.	q.—every.
Hg.—mercury.	q. i. d.—four times daily.
Inject.—an injection.	q. 1. h.—every hour.
lb.—a pound.	q. 2. h.—every 2 hours.
L.—liter.	q. 3. h.—every 3 hours.
Liq.—liquor.	q. 4. h.—every 4 hours.
Lot.—a lotion.	j.—one.
M.—mix.	
Mist.—mixture.	

THE FOLLOWING ITEMS SHOULD BE RECORDED

1. *Note and record the temperature, pulse and respiration.*

2. *Defecations:—*

- a. Amount—large, medium, small.
- b. Color—brown, yellow, clay, green, black, tarry.
- c. Consistency—scybala, solid, semi-solid, liquid, watery.
- d. Remarks. Mucus, pus, blood, stones, undigested food, worms, odor, flatus, tenesmus.

3. *Urine:—*

- a. Quantity.
- b. Color.
- c. Remarks. Turbidity, sediment, blood, odor, tenesmus, re-

tention, suppression, constant dribbling (incontinence). All abnormal discharges must be reported and described.

4. *Skin*:—

- a. Note condition of the skin as to color, rash, desquamation, marks, swellings, whether hot, dry, or moist, waxy, edematous, cyanotic or jaundiced, special odors as of typhoid, small pox, etc.
- b. Note condition of nails—discolored, blue, dry, or brittle.
- c. Note condition of hair and scalp.

5. *Cough*:—

- a. Frequency and duration.
- b. Character. Whether loose, dry, hard, hacking, or painful.
- c. Worse when sitting or lying.

6. *Expectoration*:—

- a. Amount.
- b. Character. Mucous, muco-purulent, tenacious (pneumonia), frothy, rusty, odor, blood, pure pus. The sputum should be saved for inspection by the physician.
- c. Notice the way in which the sputum is brought up.
- d. Hygiene. Have the patient expectorate in a square of tissue paper and burn. A sputum cup may be used. If lined with paper remove the paper and burn. Boil the cup daily.

7. *Chills*. Goose flesh, shivering, rigor. Stages—shivering, pyrexia, sweating.

Record time of occurrence, length and T. P. R.

Always report a chill to physician or head nurse as soon as possible. Unless otherwise ordered take the T. P. R. frequently following a chill.

8. *Delirium*. Quiet, active, muttering, picking at bed-clothes or imaginary objects, violent. Delirious patients must not be left alone.

9. *Consciousness*:—

- a. Stupor. Partial unconsciousness from which a patient can be aroused.
- b. Coma. When the patient can not be aroused.
- c. Coma vigil. Unconsciousness with the eyes open.

10. *Special Organs*:—

Ear: a. Swelling or tenderness.

b. Discharge.

c. Ringing in the ears.

d. Difficulty in hearing.

Eyes. a. Inflammation.

b. Presence of discharge, serous or purulent.

c. Swelling of the lids.

d. Oversecretion or lack of tears.

e. Unequal dilatation of the pupils may mean a very serious condition of the eyes or brain.

f. Squinting or strabismus.

g. Photophobia.

Nose. a. Presence or absence of any discharge, and its character.

b. Dilatation of alae nasi in breathing.

Mouth. a. Condition of teeth and gums.

b. Tongue. Trembling, coated, furred, fissured, dry indentations of teeth, and color (light, gray, brown, red), strawberry tongue as in scarlet fever.

c. Breath. Fetid or foul, sweetish, gangrenous, odor of drugs or anesthetics.

11. *Sleep*:—

Quiet, restful, broken, restless when asleep.

Does patient sleep all night but waken tired?

Is patient hard to waken?

Twitching of muscles, muttering, or any sign of delirium.

12. *Pain*:—

a. Origin. Inflammatory—increased by pressure.

Nervous—relieved by pressure.

b. Character. Throbbing, steady, darting, dull, heavy, neuralgic, grinding, colicky,

c. Time. When most severe. Items influencing character. Constant, intermittent or paroxysmal.

d. Location. Pain in head—frontal, occipital, one-sided as in migraine accompanied by nausea or vomiting or by flashes or spots before the eyes.

Pain in chest—may be accompanied by rapid or labored respiration and may be affected by change in position, or present only on deep breathing.

Pain in abdomen—continuous or spasmodic. In abdominal inflammations the knees are drawn up to relieve the tension. Note whether the pain in abdomen is localized; if so, notice amount of tenderness, rigidity or distention.

13. Nausea and Vomiting.

- a. Nausea continuous without vomiting.
- b. Vomiting without nausea.
- c. Vomiting after taking medicine or nourishment.
- d. Color of ejected matter—green, bloody, brown.
- e. Odor of vomitus.

14. Hematemesis. Vomiting of blood from the stomach.

The ejected matter has the appearance of particles like coffee grounds if it has been in stomach for some time; if fresh, dark red clots with an acid reaction, and may be mixed with food particles.

15. Hemoptysis. Spitting of blood from the lungs.

It is raised by coughing and is bright red in color, frothy, and of an alkaline reaction.

16. Food.

- a. Amount.
- b. Is it relished?
- c. Cravings
- d. Difficulty in swallowing.
- e. Does patient masticate thoroly?

17. Appetite.

- a. Anorexia. Absence or loss of appetite.
- b. Bulimia. Excessive, morbid hunger. Notice whether appetite is good or capricious.
- c. Thirst. Excessive or otherwise.

18. Facial Expression. Anxious, pinched, dull, listless, tranquil. Hot flushes of face, paleness, cyanosis.

The visits of the physician should always be recorded. One great point of distinction between the trained and untrained nurse is the ability of the former to observe accurately and to describe intelligently what comes under her notice.

THE SICK - ROOM

Beds and Bed Making

Parts and materials. Bed-steads are made of iron, brass or wood. The iron bed-stead is the best because it is easily cleaned, simple, durable, and of medium weight.

The springs should be made of woven wire, and supported underneath by coiled springs.

Mattresses are made of wool, hair, felt, straw, or moss. In some cases air or water mattresses have certain advantages.

MAKING THE BED. SURGICAL

1. The mattress should be turned daily or as often as possible.

2. Place a cotton pad the same dimensions of mattress as to length and width.

3. Rubber draw sheet. The upper edge at lower edge of where the pillow would come. The lower edge should reach well below the hips.

4. The cotton sheet should be $\frac{3}{4}$ yard longer than bed and wide enough to tuck in well on both sides. Place wide hem at the top, and tuck in well at the head of the bed. Draw tightly and tuck firmly at the foot. Tuck in the sides, making square corners. Be sure that the sheet is put on straight, for, if not, it will form wrinkles.

5. Cotton draw sheet. Fold an ordinary sheet lengthwise to make it the proper width. Place the folded edge at the lower edge of the pillow. Tuck in at the sides snugly and firmly.

6. Upper cotton sheet. About 9 inches of the upper edge should be allowed to turn over the blanket. Tuck in at the foot, making square corners at the sides.

7. Blanket and spread. The folded edge of the blanket should be placed at the foot.

Items to be heeded.

1. Avoid linen sheets. They absorb moisture from body rapidly, and have a tendency to chill the patient. They are good conductors of heat.

2. Air the bedding daily.
3. Exercise economy in the use of linen.
4. With a bed patient, generally a change of one sheet daily is all that is needed. Take the under sheet for the draw sheet and the top sheet for the under sheet. In this way the fresh sheet will be at the top.
5. Fresh blood stains can be removed from the blankets or ticking by spreading over the spot a paste of fine starch or wheat flour and allowing it to dry. Upon rubbing it off, if the stain is not entirely removed, a second application will generally be effectual.
6. Remember that day or night an occasional smoothing and tucking in tightly of the undersheet and draw sheet and a straightening of the top sheet as well as the shaking and turning of pillows, adds much to the comfort of the patient.
7. Keep the bed free from crumbs and wrinkles.
8. When there is danger of the bed being soiled frequently, place the rubber sheet directly under the draw sheet.
9. A neatly kept and fresh looking bed always speaks well for the nurse.

THE OBSTETRICAL BED

1. Make the bed as for a surgical patient.
2. Pad with newspapers.
3. Pin over this a clean sheet. Have sterile if possible.
4. Kelly pad. This convenience often has to be dispensed with in private practice. It can be substituted by hip pads which should be changed as often as necessary.
5. After delivery the newspapers and pads are removed and the patient is on a fresh, clean bed.

THE FRACTURE BED

Make up a bed as for a surgical patient.

Place under the mattress a fracture board made of slats one inch thick and three inches wide. This will be lighter and afford better ventilation than a board that is not perforated.

A fracture bed must be firm and unyielding.

CHANGING BED LINEN

This should be done with as little fatigue and discomfort to the patient as possible.

1. Losen the bedding on all sides.
2. Leave only the upper sheet or a single blanket over the patient, who should be placed as near one edge of the bed as possible.
3. The lower sheet and draw sheet are then folded separately on one side along their whole length as flatly as possible until they are close to the patient.
4. Take the fresh sheet, fold it lengthwise, place on bed with the folded edge as near the middle as possible, and tuck in the under half at the ends and side. The remaining half is folded lengthwise alternately backward and forward and placed close to patient under the soiled sheet.
5. Fold the draw sheet and place over this the under sheet.
6. The nurse then goes to the opposite side of the bed and turns the patient on the side with face toward her. She can hold the patient in this position with one hand and tuck the sheets to be removed as close to the back of the patient as possible. The fresh sheets are brought over to cover the place occupied by the soiled ones.
7. The nurse then gently turns the patient on the back and toward the opposite side of the bed.
8. The soiled sheets are quickly removed and the fresh ones drawn into place. Tuck in snugly on all sides.
9. Place the fresh top sheet over the soiled one, and pull the latter out from underneath.

If a patient is quite helpless it will take a second person to assist. If the patient is not able to be turned, the bed linen should be changed from the head of the bed toward the foot. The fresh sheet is folded crosswise alternately backward and forward. The shoulders and back must be raised and sheet worked down. Then raise the hips and pull the sheet still farther down. Continue until it is tucked under at the foot of the bed.

CHANGING GOWN

All hospital patients should have gowns that are open in

the back, as they are much more easily changed. However, a nurse often has to change a gown opening in the front, which is the kind ordinarily worn.

1. Removing the soiled gown.

- a. Lift hips and slip the soiled gown above the hips.
- b. Lift the shoulders and slip the gown above the shoulders.
- c. Remove one sleeve and slip the gown over the head.
- d. Then the last sleeve is easily removed.

2. To put on fresh gown.

- a. Gather the gown up in such a way that it forms a circle.
- b. Place on the chest, so that the folds in the center of the back will be just beneath the chin.
- c. Sleeves should then be carefully put on. Lift the head gently. Slip the garment over it and draw it down over the shoulders.

LIFTING THE PATIENT

1. To move a patient in bed, the nurse's right hand should be placed well under the upper part of the patient's back, and around the opposite shoulder. The left hand is put over the patient and slipped under the back. The patient places her arm around the nurse's neck if she is able to assist. Otherwise the nurse's left arm should be placed under the patient's back a little below the shoulders and from the same side. Then lift gently. The lower half of the body is now lifted in the same way.

2. It is better that three nurses should do the lifting if the patient is very heavy or feeble. These three nurses must stand on the same side of the bed in this case at the patient's left.

Nurse No. 1. Place the right arm under the back of the neck and the head of the patient in such a way as to support the head (lifting pillow under the head), and place the left hand under the lower part of the shoulders.

Nurse No. 2. Place the right arm under the back at the waist line and the left arm under the hips.

Nurse No. 3. Place the right hand under the thighs just above the knees, and with the left hand support the feet.

All should lift at the same time. Have the patient's arms folded over the chest and see that she is covered with a sheet. Many nurses complain of having strained their backs lifting;

but this is, as a rule, unnecessary if the underlying principles of "lifting" are observed. Remember the following: Always bend from the hips, keeping the spine *straight*. Separate the feet and bend the *knees*. Let the weight fall on the arms and legs. In this way heavy people may be lifted with comparative ease.

To lift patient toward the head of bed. The right hand is placed well under the back, the heavy part of the shoulder being supported with the upper part of the arm and shoulder. The left hand is placed below the hip. Lift gently and firmly.

PREPARATION FOR GIVING DOUCHE AND ENEMA

Have in readiness at least six pillows, a newspaper pad with a towel over it, a "perfection" bed pan which has been warmed, also plenty of newspapers. If the patient is entirely helpless three nurses should gently lift the patient as previously described and the regular nurse from the opposite side of bed, slip three pillows under the head, two under the shoulders and one under the lower back.

The newspaper pad is then placed where the hips would come, and the bed pan next with a small pad upon it. The patient is then gently lowered onto the pan and pillows. The knees and feet are supported and a newspaper "dash board" placed in the pan. The patient should be in as comfortable a position as possible and the nurse be sure that the pan is on a level. When thru, remove the pan, and cover it with a newspaper. Cover the patient and remove the pan from the room as quickly as possible. Finally wash the patient and remove newspaper and surplus pillows.

WHEEL CHAIRS

Wheel chairs can be firmly padded with pillows and made just as comfortable as a bed.

Place one large pillow lengthwise at the back, one crosswise in the seat of the chair, one lengthwise under the legs, and one over the angle of the seat. Put a blanket over these and lift the patient carefully from the bed to the chair. Place extra pads and cushions where they seem to be needed to make the patient comfortable. Special blankets should be provided for the outer covering instead of bed blankets. Tuck the pa-

tient in snugly if going out of doors or if the chair is to be placed where the patient will be exposed to cold in any way.

THE SICK ROOM ITSELF

Location. If possible choose a large room on the sunny side of the house and as near conveniences as possible. It should be airy and quiet. There should be a good dressing room where all clothing, linen, dressings, medicines and appliances may be kept.

Furnishings. The following may be considered ideal:—

1. The walls and ceiling should be hard finished and of a soft tint that will be restful to the eyes.
2. Bed—An iron bed if possible,—a regular surgical bed is better.
3. Easy chair and a straight chair.
4. Screen.
5. Wheel chair at hand if possible.
6. Washstand.
7. Dresser.
8. Bedside table.
9. Center table.
10. Woolen and heavy draperies should be avoided. The curtains should be of a light washable material.

Sick room appliances:—

- | | |
|-------------------------|---------------------------|
| 1. Drinking tubes. | 7. Bed rests. |
| 2. Square cotton pads. | 8. Bed cradle. |
| 3. Long cotton pads. | 9. Kidney pan. |
| 4. Rubber air cushions. | 10. Urinal. |
| 5. Heel cushions. | 11. "Perfection" bed pan. |
| 6. Bed cushion. | |

Hygiene of the sick room:—

The temperature must be kept as even as possible. From 65° to 70° F. The air must be kept pure and cool. The nurse should be diligent in securing good ventilation. In the winter time in almost every case the window can be dropped one and one-half inches from the top. Hot air rises and displaces the cold air, which becomes warm as it descends.

A board from four to six inches wide may be placed under the lower sash and fresh air will enter between the sashes,

thus preventing a draught. Opening a window widely at top and bottom and covering patient, will air the room thoroly. If the patient is afraid of draughts an umbrella may be held over him or a screen placed before the bed. This may be done three or four times a day.

A fire-place is an excellent ventilator. A small fire can easily be made and it not only assists good ventilation but gives a cheerful aspect to the room.

Three thousand cubic feet of air should be supplied each person in an hour.

Place the bed so that the light will not shine directly in the patient's eyes. At night the lights should be shaded and in the day time the patient's eyes should be protected from the full glare of light.

All excreta and soiled linen should be removed from the room as soon as possible, as they are sources of contamination. In removing vomited matter, evacuations from the bowels or bladder, cover the vessel or pan with a towel or rubber cloth. The room should be kept free from dust. Absolute cleanliness should be the slogan of the sick room.

How to clean surgical room:—

1. Dust all furniture daily with a cloth slightly oiled.
2. Keep the crockery clean and shining.
3. Wash the floor daily.
4. When dust accumulates on the floor during the day wipe it up with a damp cloth or with a broom covered with a damp cloth.
5. Keep fresh covers on the dresser and stands.
6. Provide yourself with a cloth for dusting furniture, and one for washing crockery. A separate floor cloth should be provided.

How to clean room of non-surgical patient:—

1. If possible remove rugs and clean them outside.
2. If rugs are too large and heavy to be removed, use a carpet sweeper and then wipe them with a damp cloth, or use a vacuum cleaner.
3. If a carpet sweeper is annoying to patient, the rug will have to be cleaned with a damp cloth, at least once a day, and sometimes twice.

4. In other points the cleaning is the same as in a surgical room.

5. If patient is able to be taken out in a wheel chair, the room can be cleaned much more thoroly during her absence.

6. Wipe off all articles and place on the bed; cover with a sheet. Then clean the entire room thoroly and replace the articles.

7. Do not neglect the polishing of faucets if there is a stationary bowl in the room.

General items:—

1. Put all waste and soiled linen in places provided for the purpose.

2. Always line the waste basket with a newspaper.

3. Keep fresh flowers tastefully arranged in the room of your patient.

4. Be careful to keep contents of bureau and washstand drawers in proper order. The closet should also be kept in perfect order.

5. Do not set glasses of fruit juice or other liquids that may cause stains on dresser or stand covers, but see that a plate is placed underneath them. Always rinse a drinking tube after the patient takes anything but water. Keep the pitcher of drinking water covered.

6. Provide yourself with the needed cleaning cloths, and wash them when necessary.

7. Have a place for everything and keep everything in its place.

8. Keep faucets in the room polished and scrub the bedpan and urinal daily. Urinal brushes may be used to clean urinals.

9. Do not allow treatment bowls to become dark and stained. If they are properly cleaned daily they can be kept perfectly white.

10. Do not set bottles of alcohol or bowls or pails containing hot substances on the furniture unless very well protected.

Proper attention to details characterizes the successful nurse. Let each keep a high ideal in view and strive to make progress each day.

PERSONAL CARE OF PATIENT

1. Morning and evening toilet. Wash the face, hands,

neck and ears, clean the nails, comb the hair, brush the teeth and wash the mouth.

2. Keep the bed fresh and free from wrinkles and crumbs.
3. See that the patient is as comfortable as possible.
4. Keep the toe nails clean and trimmed.
5. Give thoro and careful treatment.
6. See that the food is served properly.
7. Anticipate the needs of your patient.
8. Be neat and clean in your personal appearance, as this is a duty you owe not only to your patient but also to yourself.
9. Properly ventilate the room.
10. Do not talk too much. Avoid gossip.
11. Endeavor to minister in the spirit of the Master.

CLINICAL PROCEDURES

Lavage

1. Articles necessary:—

- a. Sheet.
- b. One-half dozen napkins.
- c. Pail of drinking water (105°).
- d. Quart pitcher.
- e. Lavage tube.
- f. Wash bowl.
- g. Slop jar.

2. Giving lavage:—

- a. Have the patient remove collar and loosen every constricting garment. Also remove false teeth.
- b. Have the patient sit in a chair.
- c. Fasten a folded sheet around the neck in such a way as to protect the clothing perfectly.
- d. Fold the napkin under the chin.
- e. Place the slop jar in front of patient with bowl on top of it.
- f. The pail of water, pitcher and napkins should be within easy reach.
- g. The tube should be wet in the drinking water before being passed.
- h. Placing left arm around patient's neck in such a way as to support the tube, the patient is requested to open mouth and swallow as the tube touches the back part of the throat. Instruct patient to breath thru the mouth.
- i. In the average case pass tube about 16 inches.
- j. Coughing and cyanosis indicate that the tube has been passed into the trachea. Withdraw it immediately.
- k. After the tube is passed, pour in about a pint of water, and when tube is about empty, quickly lower it over bowl and allow the water to siphon out of the stomach. Empty the water into the jar underneath.
- l. If the water does not come quickly withdraw the tube slightly and tell the patient to contract the abdominal muscles.
- m. Repeat washing until the water returning is perfectly clear.

n. The napkin should be changed as often as needed to keep mouth free from mucus and saliva.

o. Remove the tube quickly. Give the patient a napkin to dry the mouth.

p. Encourage the patient and endeavor to allay all fears.

3. Cleansing of tube:—

a. Rinse in clear water.

b. Wash in strong soap suds.

c. Rinse again.

d. Let stand one-half hour in a solution of formaldehyde, using 25 c. c. of the formalin to a quart of water.

e. Rinse again and dry.

f. Place in a clean napkin.

g. The lavage outfit (pail, pitcher, and tube) should always be returned to the cupboard in perfect order and ready for use.

The Test Breakfast

1. The breakfast itself:—

a. No food or water should be taken after rising in the morning before the time for eating the meal.

b. At the time appointed for the meal, the patient should eat 1 1/2 oz. granose (dry), taking about 25 minutes to eat it, being careful to masticate thoroly every particle.

c. The patient should then take 200 c. c. of water.

d. The patient should then lie on the left side until one hour from beginning to eat the granose.

2. To take up the breakfast have the following articles in readiness: 2 glasses, lavage tube, sheet, napkins, large bowl.

a. At the appointed time have the patient sit in a chair. Place a sheet around him, with a bowl in front on the floor.

b. The nurse should scrub her hands thoroly.

c. Pass the tube as in giving a lavage.

d. Place a glass in the bowl.

e. Stand in front of the patient. Pinch tube above the bulb with thumb and first finger and immediately compress bulb with remaining fingers.

f. Immediately the air is pressed out of the bulb, pinch the tube below the bulb and release the bulb.

g. Have the patient lean forward and contract the abdominal muscles, pressing the hands over the stomach at the same time.

This generally fills the bulb; if not, draw tube out a few inches and pass back again. When the bulb is full, grasp the tube again above the bulb and press the contents into the glass.

h. Repeat the above procedure until the stomach is emptied or until a sufficient amount has been gained for a test.

i. Next pour into the funnel 100 c. c. of distilled water. Allow sufficient time for the water to pass entirely out of the stomach tube.

j. Instruct the patient to move the abdominal wall in and out rapidly so as to mix the water with the remaining contents of the stomach.

k. Remove as much as possible of this mixed fluid putting it into the second glass.

l. Some prefer the use of a large suction bulb which is so constructed as to be quickly attached to and removed from the tube. The contents of the stomach is drawn out into this bulb which is removed and emptied into the glass.

m. Remove the tube quickly and press out the remaining contents into the glass.

n. Clean all articles as after a lavage. Reset the tray and return to the cupboard.

o. Label the first taken up "Test Meal," the second "Lavage Specimen."

Nasal Douche

1. Small irrigating can, placed one foot above the patient.

2. Temperature 100°.

3. Saline solution (1 teaspoonful to 1 pint of water). Plain water is more painful because more quickly absorbed, causing fullness and pressure.

4. A nasal tube should be attached to the rubber tubing.

5. Care as to position. The patient should sit with the head bent forward over a receptacle. The mouth should be open so that air can pass thru it.

6. The tube should be inserted into one nostril. The water will flow out thru the other nostril.

7. The patient should never swallow while taking the douche, as this opens the Eustachian tube, and may injure the ear.

8. The douche should be copious, one quart or more.

Aural Douche

1. Same can as for the nasal douche, or a smaller one.
2. Attach the aural tube to the rubber tubing.
3. Solution as prescribed should be used. For earache or pain, the temperature should be 105° to 108° , as can be borne.
4. For softening and removing wax, the douche should be given at low pressure, the can on a level with the auditory canal.
5. A tray should be held under the ear, and the water be allowed to run in a continuous stream.
6. Patient may be in a sitting or reclining position.
7. Never introduce anything cold into the ear.
8. Do not be alarmed if the patient becomes dizzy—simply stop the water for a few minutes and remove the water in the ear by a pledget of absorbent cotton. When thru, dry the ear by applying cotton.
9. Never use medicines in the ear without a prescription, and then be sure they are thoroly dissolved.
10. If a patient is going out after treatment, put a little cotton into the outer ear and instruct the patient to remove it on coming in.

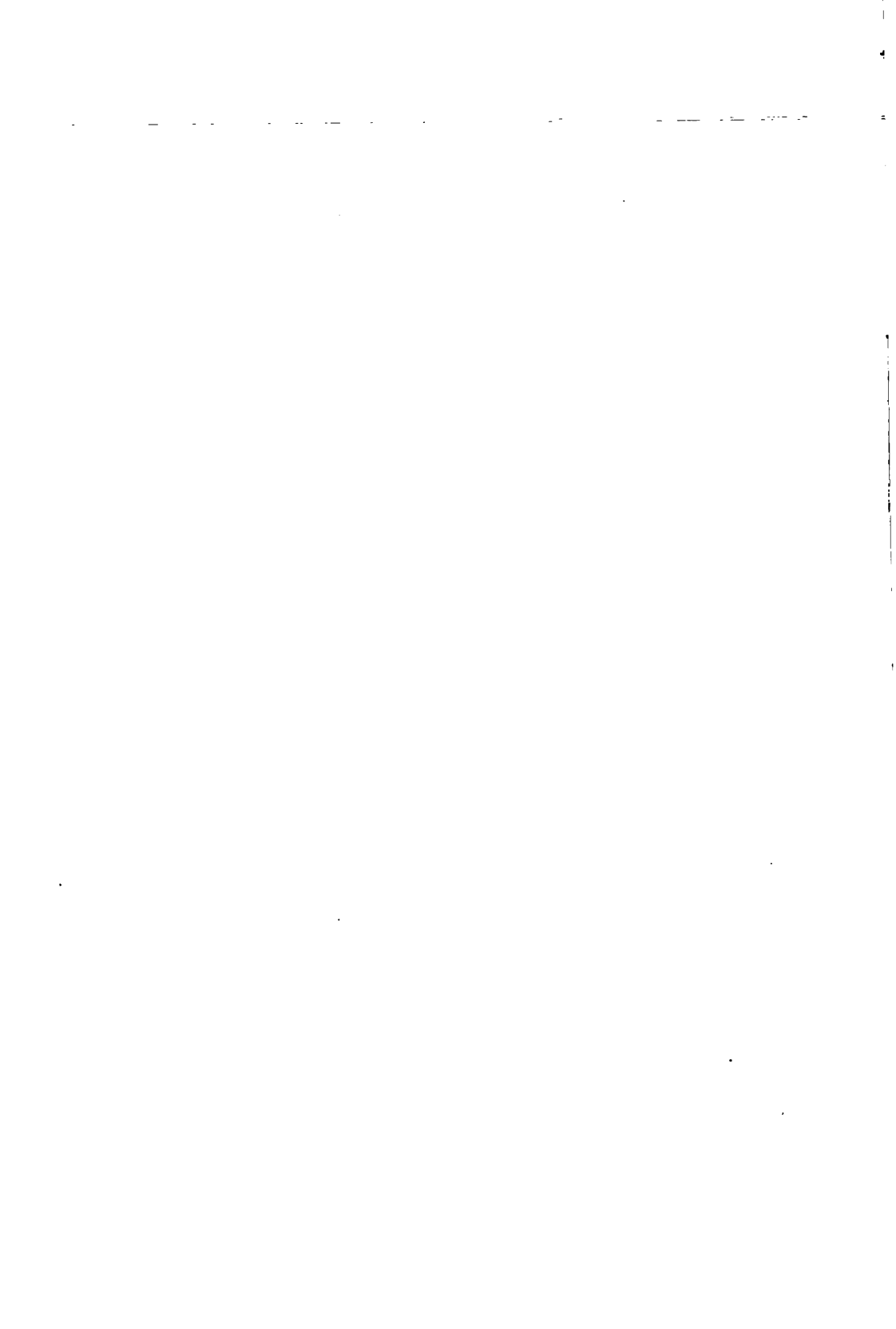
Hypodermatic Injections

A hypodermatic injection is the introduction of a medicine under the skin by a specially constructed syringe, designed to produce a more rapid and certain effect than can be gained if the medicine is given by mouth or per rectum. The most convenient places for injection are the outside of the arms, the forearms, the thighs, the chest, and the abdomen. Avoid bones, large blood vessels, and nerves. Insert the needle into a fleshy part.

1. Cleansing of needle and syringe:—

- a. Boil or otherwise thoroly disinfect the whole instrument at frequent intervals.
- b. At other times the barrel may be cleansed by washing in alcohol and rinsing with boiled water.
- c. Boil the needle or disinfect in alcohol before using.





2. *The hypodermic tray contains the following articles:—*

- | | |
|---|---------------------------------|
| a. alcohol lamp. | e. small bottle of alcohol 95%. |
| b. a spoon. | f. " " " boiled water. |
| c. matches. | g. 2 small glasses. |
| d. a small jar filled with
cotton balls. | h. the medicine to be used. |

3. *Technique of administration:—*

- a. Pour alcohol into one glass, and boiled water into the other.
- b. Cleanse the barrel of the syringe as directed.
- c. Boil the needle in a teaspoon over the alcohol flame.
- d. Pour off water carefully and place the needle on the barrel, being careful not to touch the point.
- e. Put the tablets ordered into the spoon and pour on the proper amount of boiled water. Dissolve over flame and draw the solution into the barrel of the syringe.
- f. See that the air is expelled from the barrel.
- g. Disinfect the skin with alcohol, grasp the fleshy part between the thumb and finger, and insert the needle in a slanting direction.
- h. Withdraw the needle slightly, and inject the fluid slowly.
- i. Quickly remove the needle and place a cotton pledget over the part, making a slight pressure.
- j. Cleanse the needle and syringe with alcohol.
- k. Put a small wire thru the needle to keep it from rusting.
- l. Always leave the tray in *perfect* order.

4. *Precautions.* If the needle and solution are not clean, abscesses are liable to develop.

Never give a hypodermic without an order from the physician, and do not repeat without definite order to do so.

Catheterization and Bladder Irrigation

The normal amount of urine secreted daily averages forty ounces or 1200 c. c.

An absence of the urinary excretion, owing to a failure of the kidneys to act, is known as *suppression*.

Retention is the failure to expel that which is contained in the bladder.

Incontinence is the involuntary passing of urine.

Cystitis is an inflammation of the lining of the bladder.

Whenever, from any cause, a patient is unable to pass urine voluntarily, the catheter should be used every six or eight hours.

1. *Articles needed for catheterization:—*

a. Two medium sized bowls. The first contains two catheters of glass, metal, rubber, or lysle thread; the second a disinfectant solution, HgCl_2 —1—3000, boracic acid—sat. sol., creasope or lysol—1/2%, green soap—2 1/2%.

b. A package of sterile *sponges*, or *cotton pledgets*.

c. *Sterile* lubricant—vaseline or any good oil, if sterile.

2. *General procedure:—*

a. Boil the catheter ten minutes. In the meantime the patient should be gotten ready.

b. Place a folded towel under the hips. Cover the limbs with a sheet, if the room is cold, use a light blanket and also a sheet. Do not unnecessarily expose the patient. Scrub your hands thoroly.

c. After the catheter is boiled, place a tray between the limbs of the patient, also a urinal or receptacle for receiving the urine.

d. Open a package of sponges, being careful not to touch them.

e. Open the tube of lubricant, discard the first portion, and then squeeze out a small portion onto a sterile sponge.

f. Dip the right hand into a disinfectant. Wet a clean sponge in the disinfectant solution and wash thoroly the part all about and over the meatus urinarius.

g. Dip the hand again in the disinfectant with a fresh sponge, wash the meatus urinarius with sterile water.

h. Grasp the catheter below the part that will enter the bladder, lubricate it with the oil previously placed on the sterile sponge, and insert into the urethra. Pass gently along until the urine flows. If, after the catheter has been inserted the necessary distance, the urine does not pass, withdraw slightly, turn and then insert farther than before.

i. If the bladder is *excessively* distended do not empty at one time, as undesirable symptoms are apt to follow. Draw only a portion and in a short time repeat the process.

j. When the urine has ceased to flow, compress the catheter or put the finger over the end, so that no urine will escape and soil the bed, while the catheter is being withdrawn.

k. Sponge the meatus urinarius with boiled water. Measure the urine and record the quantity and character of the same.

3. *Special procedure in the male.* The male urethra is from 7 to 8 inches in length and is divided into three portions; the anterior or penile portion about six inches long, the membranous portion about a half inch long, and the prostatic part one inch in length. The posterior end of the penile portion is wider than the anterior part, and the prostatic portion is the widest and most variable in shape, size, and length. It is in these two parts that a rubber catheter is most likely to double upon itself and in the prostatic portion the obstruction of an enlarged prostate may make its passage difficult.

For use in the male urethra catheters are made of soft rubber, semiflexible (black) rubber, metal or lysle thread. If difficulty is experienced in passing an ordinary rubber catheter, an olivary tipped black rubber or lysle thread catheter should be tried. In passing a metal catheter it must be specially directed. This requires demonstration.

Before passing the catheter, grasp the organ with a napkin just below the glans and wash thoroly the entire glans. Follow by washing with a disinfectant. A sponge of absorbent cotton dipped in the disinfectant should be left over the glans while other preparation is being made. In passing the catheter straighten the urethra by gentle traction, go slowly and withdraw the catheter if an obstruction is met, turning it around advance it again. If a reasonable amount of gentle careful work does not succeed, summon the head nurse or the physician in charge.

4. *Special procedure in the female.* With the left hand separate the labia and hold apart during washing and disinfecting the parts and inserting the catheter.

The meatus urinarius is variously located in different patients. In one you will discover it high. In another case it may be much lower, even in the opening of the vagina. By careful, close inspection the meatus will readily be found.

The urethra varies much in length. In a thin patient it may be but one inch or more from the meatus to the bladder. In a large, fleshy patient the urethra may be even three inches in length. Govern the passing of the catheter accordingly.

When you remove the catheter place a sponge over the vaginal opening to prevent the entrance of any urine.

5. After-care of tray.

a. Run plain water thru the catheter, then soapsuds, and rinse again with plain water. Let it stand in a disinfectant solution 15 minutes. Rinse in water and wipe dry.

b. Wash bowls and tray in soapsuds and disinfect in the solution used for the catheter. Wipe dry.

c. Place the catheter in one bowl with the other over it. Put the lubricant on the tray and also a package of fresh sponges.

6. Irrigation. In case bladder irrigation is to be given, in addition to the above preparation, prepare an irrigating can containing a sterile solution (saline, permanganate, boracic acid, or whatever may be ordered). Attached to the irrigating can is rubber tubing, at the end of which is inserted a sterile glass irrigator point.

After the patient is catheterized, the rubber catheter is not removed but the tip of the glass tube is inserted into the catheter. Be sure that all air is expelled before this connection is made. Allow about 200 c. c. of solution to enter the bladder, unless the patient complains of pain, then disconnect the irrigator point and let the solution flow from the bladder. Repeat same until the bladder is clean. Then remove the catheter according to directions for catheterization.

Many prefer a glass funnel instead of the irrigating can in giving irrigations, and some use a glass syringe. A small-size glass funnel or small glass syringe is very much handier for the instillation of medicaments into the bladder or urethra.

Carelessness on the part of the nurse in catheterization has often resulted in cystitis. One must be thoroly conscientious in all details else weeks of needless suffering may result.

Nasal Feeding

When patients refuse food by the mouth, it is oftentimes necessary to resort to nasal feeding. A nurse should never attempt this unless she has at least seen it done, or has assisted some one else. Never be afraid to say, "I don't know," for otherwise you may bring much unnecessary suffering to a patient.

If a patient resists at all, there should be two attendants to hold him in the proper position—either sitting or lying.

1. Articles needed:—

- a. A No. 8 catheter to which is attached a small glass tube. To the end of this a small piece of rubber tubing is attached and into this a glass funnel is inserted.
- b. A towel to place around the patient.
- c. Lubricant.
- d. Liquid food in a pitcher.

2. Technique:—

a. Oil the tube and insert into the nostril, passing it backward thru the posterior nares into the upper part of the pharynx. If it is passed farther it should be pushed on down into oesophagus. If the catheter enters the trachea the patient coughs, can not breathe, and becomes cyanotic. After the tube is in place, be sure that the patient breathes normally.

b. When the tube is in place, pour the food down and remove the tube quickly, pinching it as near the nose as possible.

c. The tube is then cleaned, using the same method as for lavage tubes.

The Nutrient Enema

In various gastric disturbances the digestion of the food is so imperfect that the body is poorly nourished, so that it becomes necessary to supply the needed nutriment by other avenues than the mouth, one of these being per rectum by means of the nutrient enema. This may also be resorted to in obstructive conditions of the oesophagus or where it is desired to give the stomach rest for a time.

1. Preparation of the patient. Before giving the nutrient enema a thoro cleansing enema should be given as absorption takes place much more rapidly when the lower bowel contains no residue. If the nutritive enema is given frequently, as a rule, the cleansing enema is necessary only once or twice daily.

2. Technique. The nutrient enema may be given with the patient in either the dorsal, the right Sim's, or the knee chest position. However, if the patient is able to take the knee chest position, this is preferred.

The liquid for injection is then prepared by the nurse according to the prescribed formula.

The following articles are needed for the administration of a nutrient enema: Colon tube, in the end of which a glass funnel has been inserted, a small pitcher containing the liquid to be injected, lubricant, bed sheet, newspaper or rubber sheet, towel.

The liquid should be given at a temperature of 100° F. If the enema is to be given in the knee chest position, place the newspaper or rubber sheet, covered with a towel, under the knees of the patient. Next drape the hips and thighs in a sheet for protection from unnecessary exposure. The sheet is held lengthwise, grasped in the center and this point placed on the sacrum, each half being used to cover a limb. Next lubricate the tube and insert it not more than four inches. Pour the liquid into the funnel. After the liquid has passed into the bowel, leave the colon tube in place a few moments, then slowly remove, pinching the end next to the patient, in order to avoid the expelling of any of the fluid. Assist the patient to the recumbent position.

If there is an intense desire to eject the fluid, hold a compress over the rectum, making heavy pressure with the fist. This, as a rule, will be effective.

Oftentimes a patient can not take the knee-chest position, and experience has shown us that with some people the fluid is injected with difficulty in the other two positions. In such cases, the following may be used with success.

Take a 2-ounce glass syringe, a colon tube, and a pair of artery forceps. Lubricate the colon tube and insert as before. Fill the glass syringe and insert into the colon tube, forcing the fluid thru it by pressure on the piston of the syringe. Before removing the syringe to refill, clasp the tube with the forceps as soon as the syringe is placed in the end of the tube. When all the fluid has been injected, remove the tube as usual.

3. *Formulae.* As a rule the physician prescribes the formula for the nutrient enema. The following are given as examples:—

- I. Milk $\frac{3}{4}$ iv.
1 beaten egg.
8 gr. of salt.
- II. The whites of 2 eggs.
Peptonized milk $\frac{3}{4}$ ij.
8 gr. of salt.

- III. Malted milk broth 3 iv.
1 beaten egg.
8 gr. of salt.
- IV. Thin barley gruel (thoroly cooked) 3 vi.
1 beaten egg.
8 gr. of salt.

Poultices or Cataplasms

1. Purpose:—

- a. To make application of moist heat.
- b. To produce counter irritation.

2. Items to be observed:—

- a. A poultice should not be removed until a fresh one is ready to apply. Always wipe the part dry before placing the poultice.
- b. Poultices must be freshly made each time they are needed.
- c. The poultice should be covered with flannel and rubber cloth or oiled silk in order to retain the heat and keep the patient dry.
- d. The spreading of the poultice is facilitated by the use of a thin piece of board—a poultice board—upon which the cloth is laid.
- e. A poultice should be applied as hot as the patient can stand.
- f. It should never be left on until cold.
- g. Oil the skin before applying a poultice.
- h. Take a piece of muslin twice the length of the poultice.
- i. On one half spread the poultice ingredients leaving a margin of 1 1/2 inches.
- j. Fold the other half over as a cover, turning the edges in.
- k. Fold in a compress cloth or towel and carry to the patient on a rubber bag filled with hot water.

Flaxseed poultice. Stir the meal little by little into boiling water. When of the consistency of mush, remove from the stove, beat well and spread about 1/2 inch thick on muslin and apply in the usual way.

Mustard poultice. a. Make a flaxseed poultice as usual. Take of mustard 1/8 to 1/4 of the amount of meal used, make into a thick paste and stir this into the linseed that has been prepared for the poultice.

b. Mix together 1 part flour and 2 parts mustard. Moisten with water and add a small amount of oil.

c. White of one egg lightly beaten. Add sufficient mustard to make of proper consistency. If a very mild effect is desired, use mustard and flour equal parts, with the white of egg. For an infant use 1 part of mustard to 12 parts of flour.

Spice poultice:—

Ginger 3 ij.

Clover 3 ij.

Cayenne Pepper 3 j.

Flour 3 ss.

Sufficient water to make a paste.

Spread between two layers of muslin.

Glycerin and clay poultice. This is sold under various trade names, such as antiphlogistine, anti-thermoline, anti-itis. Heat and spread about 1/2 inch thick on a muslin cloth cut to fit the part. Over this place thin gauze. Apply the gauze side to the part affected. Cover with a pad made of cotton enveloped with gauze. This cotton pad can generally be used several times.

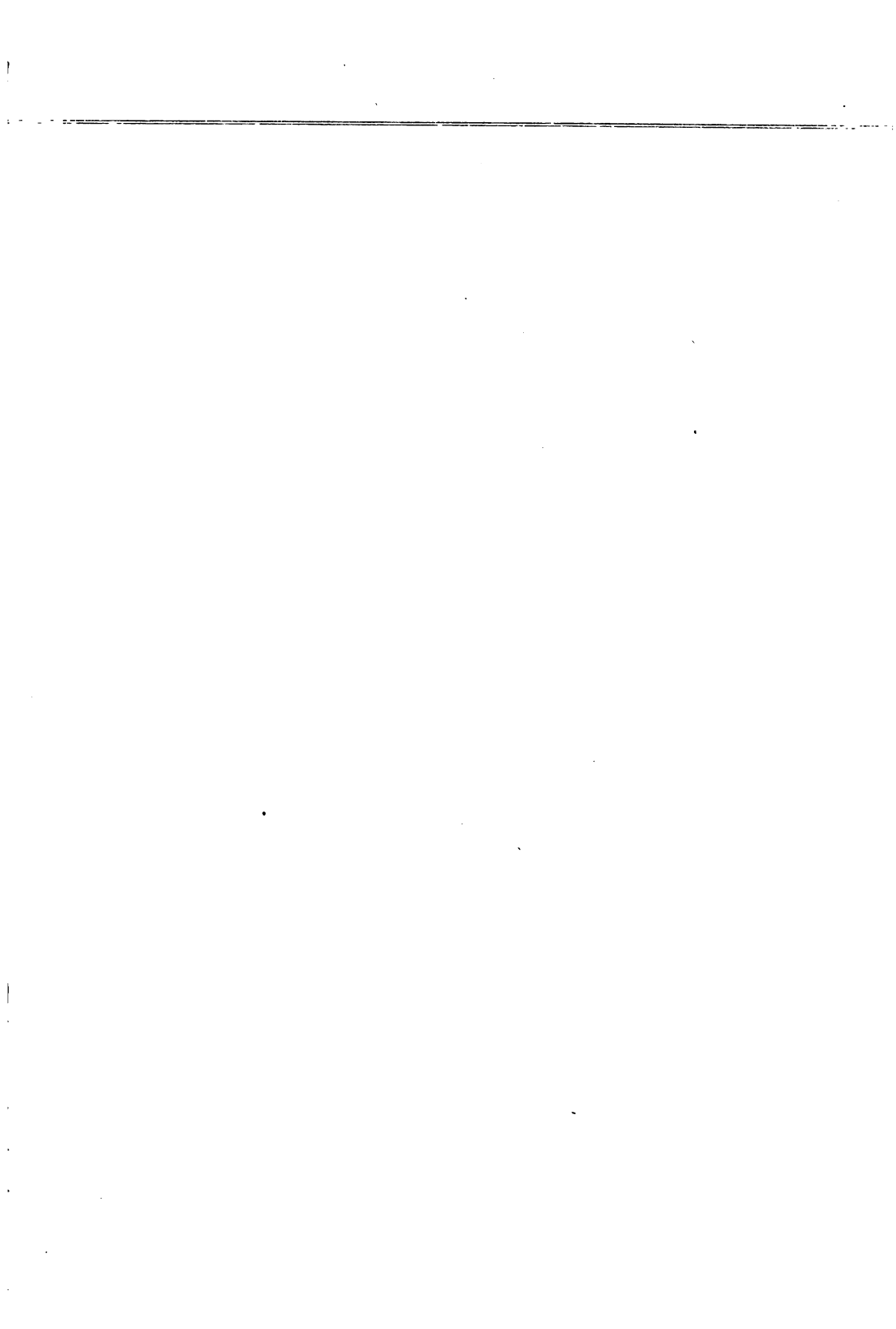
Clay jacket. Take two pieces of muslin. Cut to fit the anterior and posterior area of the upper trunk. Spread on the antiphlogistine as directed above and also the gauze. Apply to the surface and over this fit a jacket of cotton.

Diet

In such an outline as this only a few general items can be given on diet, as this subject is a broad one and is always taken up as a branch by itself. Special diets are often prescribed for patients, and the general significance of the terms used to describe them should be understood by the nurse.

SPECIAL DIETS

1. *Fruit diet*. In following a fruit diet the nutriment given the patient is very much reduced, while at the same time the stomach is not put at complete rest; so that it is frequently better than a total fast, especially as it furnishes a residue which helps to prevent constipation. The sugars of the fruit do furnish some energy and are also laxative. It is well to administer only one or two kinds at a meal; a variety, however, may be allowed over several meals.



2. *Liquid diet.* Gruels, broths, soups, egg nogg, beaten white or whole of the egg, curdled egg, milk, cream, butter milk, clotted milk, Yogurt, malt honey, thin vegetable gelatin (agar-agar), frozen cream, fruit juices, albumin water.

3. *Soft or semi-solid diet.* Eggs, raw, soft or boiled; jelly egg, custards, soft toasts, cereals, flaked cereals, corn pulp, purees, stewed fruits.

4. *Solid diet.* The articles allowed in solid diet are those usually allowed when a *general* diet is prescribed. In selecting foods for a general diet care should be taken about combinations.

5. *Dry diet.* The articles constituting this diet are frequently ordered in cases of defective digestion, particularly where the hydrochloric acid is low in amount and also for the purpose of encouraging thoro mastication. The following articles may be included in this diet:—

Dextrinized grains, zwieback, thoroly toasted bread, toasted crackers, granola, corn breads, baked potatoes, popped corn, puffed rice and wheat berries, bananas, steamed figs, hard boiled yolk of eggs, baked apples, butter, and in some cases fresh nuts and nut foods may be allowed.

DIETS FOR SPECIAL DISEASES

1. *Constipation.* Fresh fruits, stewed fruits, stewed raisins, steamed figs, fruit juices except blackberry, lemonade, stewed prunes, flaked foods, buttermilk, Yogurt, graham gems, bran crackers, gems or mush; butter, olive oil, ripe olives, malt honey, most nuts, Irish potatoes, sweet potatoes, peas purree, spinach and other greens, all fresh green vegetables, graham bread, whole-wheat bread, coarse vegetables, berries.

2. *Diarrhea.* Hot boiled milk, brown flour gruel, arrow root or gluten gruel, albumin water, soft poached or curdled egg, rice, corn starch, toasted white bread.

3. *Hypochlorhydria.* Dextrinized cereals, baked potatoes, fresh nuts sparingly, soft cooked eggs, hard-boiled yolk of eggs, fruit of all sorts, grapefruit or orange before the meal, Yogurt, fresh green vegetables, peas purree.

4. *Hyperchlorhydria.* This condition is especially benefit-

ted by the use of free or emulsified oils such as olive oil, cotton seed oil, milk, cream, and unsalted butter; gluten gruel, eggs, dextrinized cereals, nuts and nut foods very sparingly, sub-acid fruits such as pears, baked apples, prunes, etc.

5. *Diabetes.* Avoid all starches especially those not thoroly cooked. Avoid sugar. The following articles may be allowed:—

Baked potatoes, nuts except the peanut and chestnut, nut foods, butter, cream, fresh green vegetables, greens, gluten breads, baked apples, grapefruit, lemons, strawberries, huckleberries, buttermilk, Yogurt, eggs, cauliflower, turnips, celery, cabbage, lettuce, radishes, cucumbers, egg plant, tomatoes, Jerusalem artichokes, Okra.

6. *Bright's disease.* Dextrinized cereals, soups, broths and gruels, rice, flaked cereals, zwieback, toasts, milk, cream, butter, olive oil, fresh green vegetables, fruits of all kinds. Avoid the following: Meats, nut foods, eggs, gluten, and all other heavily proteid foods.

7. *Fevers.* In fevers the diet will vary according to the nature of the fever and its duration. Broths, strained soups and gruels, albumin water, fruit juices, soft pulp of fruit, buttermilk, cereal waters, egg noggs.

RULES FOR EATING

1. Masticate the food thoroly.
2. Avoid over eating.
3. Eat slowly.
4. Do not wash the food down with a beverage.
5. Do not drink freely at meals.
6. Make the meal hour a pleasant one.
7. Do not worry over the food eaten or watch for unpleasant symptoms to develop.
8. Do not eat when fatigued or worried.
9. Remember "a merry heart doeth good like a medicine."

FOOD COMBINATIONS

Persons having digestive disturbances frequently find it impossible to take foods in certain combinations. Unless the digestion is very good there are certain combinations which should be avoided.

1. *Good combinations*:—

Cereals and nuts.
Cereals and milk.
Cereals and fruit.
Cereals and eggs.
Cereals and vegetables.
Cereals, milk and eggs.
Fruit and nuts.
Sub-acid fruit and cream.

2. *Bad combinations*:—

Fruits and vegetables.
Acid fruit and milk.
Milk and sugar.

Administration of Medicines

METHODS OF INTRODUCING INTO SYSTEM

1. *Stomach*. When given in this way drugs take effect in about 20 minutes. They are absorbed more quickly when given on an empty stomach.

2. *Rectum*. The drug is absorbed in about 3/4 hour.

3. *Cellular tissue* (subcutaneous), *i. e.*, by hypodermic. The effect of the drug is evident in about five minutes.

4. *Skin by inunction*.

5. *Lungs by inhalation*.

Sometimes a drug produces symptoms that are very different from the ordinary. Patients manifesting such a peculiarity are said to have an idiosyncrasy for the drug in question.

Some drugs have a "cumulative action," *i. e.*, the excretion of the drug is so slow, that one dose is not entirely excreted before another is taken. The drug thus accumulates, and after a time symptoms of poisoning may develop thru the cumulative action.

PRECAUTIONS IN HANDLING AND ADMINISTRATION OF MEDICINES

1. All medicines must be kept out of the reach of children and delirious patients.

2. The label and directions should be read *three times* before giving the medicine.

3. See that the relief nurse *thoroly* understands the directions in regard to the medicine to be given the patient.

4. Medicine glasses and spoons must be thoroly washed after being used. Separate ones should be kept for strong smelling medicine and oils.

5. When ordered before meals medicines should be given one-half hour before, and those to be given after meals should be given one-half hour after, unless otherwise ordered.

6. An unconscious patient should have the medicine dropped *fur* back on the tongue in order to compel swallowing.

7. Do not give powders by mouth to an unconscious patient, as they may cause suffocation.

Powders. 1. Generally given dry on the tongue and followed by a drink of water.

2. They may be dissolved in water or milk.

3. Powders that are bitter may be enclosed in capsules or wafers. The latter may be secured from any druggist. One is moistened, the powder put in its center, another wafer is laid over this and the two are pressed firmly together. Place on the tongue and swallow by drinking water.

Pills. Place on the back part of the tongue and swallow with water. For children who find it difficult to swallow a pill, it may be crushed and mixed with honey.

Acids. These injure the teeth and so should be taken thru a glass tube and the mouth thoroly rinsed after.

Oils. These may be taken in cereal coffee, milk, lemon juice, or orange juice.

Suppositories. These are drugs incorporated in cacao butter or other semi-solid substance and made up into conical shapes for convenient introduction into the rectum or vagina. To place in the rectum oil the suppository and finger. Insert the suppository and push well up into the rectum until it can not be felt by the finger. Place a napkin over the anus and apply pressure to part until the desire to expel the suppository has passed.

Inhalations. The administration of drugs in the form of a vapor, or nebula (cloud).

INCOMPATIBILITIES

When medicines do not combine well or have opposite effects, they are said to be incompatible. There are three kinds of incompatibility—chemical, pharmaceutical, and physiologic.

Chemical incompatibilities. Medicines which react upon each other, producing a new chemical substance. This is illustrated in the combining of acids and alkalies, such as hydrochloric acid and bicarbonate of soda which form common salt.

Pharmaceutical. Substances that do not mix well mechanically or do not dissolve in each other, such as oil and water.

Physiologic. When the effect of one drug neutralizes that of another they are said to be physiologically incompatible; for example, morphine and strychnin.

A medicine ordered in minims must not be measured by drops. Use the minim glass.

Full Examination

1. Articles to be in readiness:—

- | | |
|----------------------------------|------------------------------|
| a. 2 large sheets. | e. Lubricant. |
| b. 2 towels. | f. Pitcher of drinking water |
| c. 1 napkin. | and a glass. |
| d. Basin of warm water and soap. | g. Waste basket. |

2. *Instruments for examination.* These should be warmed before using.

- | | |
|----------------------------------|--|
| a. Speculum - - - | { Sim's or modified Sim's.
Bivalve.
Rectal.
Others as case may require. |
| b. Dressing forceps. | |
| c. Spatula. | |
| d. Applicator. | |
| e. Stethoscope. | |
| f. Tampons and absorbent cotton. | |

3. *Full examination in office.* Remove all clothing. Have sheet folded lengthwise and placed around the patient's shoulders, and another sheet for the lower limbs.

4. *Pelvic examination.* Place the patient on the table in the dorsal position. Take a second sheet, place over the patient so that the center fold comes to the center of the table between the lower limbs. Pull the sheet down leaving only enough to cover abdomen. Begin at crease in center of sheet, gather up in folds, and push well up over abdomen. Take inside corners and push well up under hips until it fits snugly around inside of

thighs in such a way as not to expose the patient in any way. Outside corners should be folded around the feet so as to give a neat appearance, and the patient will not feel that she is unnecessarily exposed.

Be sure that the patient is well down on the table and that there is a fresh folded napkin under the hips, covering the edge of the table.

For a pelvic examination only, it is not necessary to remove the clothing except closed drawers, which should be removed. In all cases, be sure that all bands about the waist are loosened. Place in dorsal position as for full examination.

Vaginal speculum examination. A Sim's speculum, dressing forceps, lubricant, and five or six tampons should be at hand. The table should be so placed that the light will fall directly into the speculum. In assisting the physician, be sure that you stand where you will not interrupt the light. In handling the tampons to the physician, catch the cord close to the last tampon so that the physician may easily grasp with forceps. If the other hand is free the nurse may catch the free end of the cord so that it may not become entangled around the tampon.

5. *External examination of abdomen.* Separate the two sheets so that the abdomen is exposed.

6. *Examination of heart and lungs in the sitting posture.* Have the patient sit on the end of the table with the feet resting on a stool. Place a sheet about the shoulders. Hand the stethoscope to the physician.

7. *Rectal examination.* Place on the table in the Sim's position. Adjust the sheet in the same way as for the dorsal position, except that center fold is at the back instead of the front. Fold the upper corner of the sheet around the right limb in such a way that the clothing and limbs are entirely covered. The nurse should stand at the back of the patient and place her hands one on either side of the rectum and separate the buttocks in such a way that the physician can insert the speculum.

8. *Knee-chest or genu-pectoral position.* Place the patient on the knees with the hips elevated and chest brought as close to the table as possible. Place the sheet so that the center fold is at the sacrum. Adjust it as in the dorsal position.

9. *Examination in bed.* a. If digital examination, place patient on the side of bed in the dorsal position; sheet and napkin are adjusted same as on a table in an office.

b. Speculum examination in bed. Place the patient crosswise of the bed in the dorsal position, drawing hips well down to the edge of the bed. Place a fresh napkin over edge of the bed for protection. Adjust the sheet the same as in the dorsal position on a table, being sure to keep the feet well covered. The list of instruments is the same as for speculum examination in an office. Be sure to have the bed in position to give the best light possible.

The Care of the Dead

If there are signs of death notify the physician at once. Never take the responsibility of being along with a dying patient.

1. Cool the room and remove all surplus of bedding at once.
2. Straighten limbs and close eyes. Place a shred of cotton under the eyelid to keep it in proper place.
3. Pack the nostrils, mouth, back part of nose, rectum and vagina with common cotton in order to prevent the escape of post-mortem discharges.
4. Replace false teeth as soon as the mouth is packed.
5. Place a support under the chin.
6. Wash the body with soap and water. If the case is infectious, wash in 2 1/2% carbolic solution and wrap in a sheet wrung from 5% carbolic solution.
7. If there are any wounds, do not touch bandage without instruction from physician or head nurse.
8. Place a triangular bandage around the hips, laying over the rectum a layer of cotton and some salt.
9. Manicure the nails and comb the hair.
10. Bandage the knees together. Place stockings on the feet and put on a simple nightgown.
11. Roll a small pillow and place under the hands. Also bandage the arms together across the chest.
12. Put a clean sheet on the stretcher and then the body. Elevate the head of the stretcher at least one foot.
13. Put a clean sheet over the body and remove all traces of death from the room.

14. Pack the belongings of the patient so that they can be taken with the body.

15. Leave the room in order.

16. After the body is removed, fumigate the room if the case has been infectious and the next morning return all supplies that belong to the medical department. See that they are all clean and ready for use.

CONTENTS OF DEATH BASKET

Two sheets.	Common Cotton.
Two turkish towels.	Disinfectant.
Two toilet towels.	Safety pins—medium.
Bandages for hands and knees.	Nail cleaner.
Small pillow.	Scissors.
Support for chin.	Dressing forceps.
Large triangular bandage.	Comb.
Salt.	

SPECIAL CONDITIONS AND EMERGENCIES

General Care of Infectious Cases

An infectious disease is one that is produced by the growth of pathogenic microbes in the body or on its surface. A contagious disease is an infectious disease that may be contracted without immediate contact with the patient.

All infectious diseases are caused by specific germs. Carelessness on the part of the nurse may result in untold harm, as success depends on diligent attention to minute details.

1. Isolate the patient.

2. Room:—

- a. Location—upper part of house; south and south-east, or south and south-west exposure preferred.

- b. Remove rugs, draperies, and all unnecessary furniture.

- c. Wipe woodwork and floor twice a day with 2% carbolic or 1—1000 HgCl₂ solution.

- d. When there is dust, germs are always present, so regard dust as a deadly foe. The broom may be covered with dust bag dipped in 3% carbolic. If possible, have two rooms, keeping the patient in one room during the day and the other at night.

3. Linen.—Disinfect all linen by soaking in 5% carbolic, 2% formaldehyde, or any reliable disinfectant for at least one hour. Wrap the disinfected linen in a sheet wrung from the same solution. This clothing should be boiled within one hour after leaving the room.

4. Waste basket.—It is very convenient in the care of infectious cases to have a stove in the room. Thus all waste material can be burned. Otherwise wrap the contents of the waste basket in a paper, then dip in disinfectant solution and dispose of as quickly as possible. If in a private home arrangements can be made for some member of the family to get this at a certain time each day and burn as soon as possible.

5. Dishes.—Outside of the door there should be a small table which the nurse will find useful in many ways. All dishes

should be soaked, for one hour in 5% carbolic, or better still, boiled for 1/2 hour, then placed on the table outside of the door for some member of family to get. A sheet wrung from the disinfectant solution should be hung outside the door and kept wet.

6. Discharges.—Disinfect with chloride of lime or carbolic acid, and let stand one hour. All water used in the room should be disinfected before being emptied.

7. Nurse.—Wear a surgical gown with cap of gauze over the hair. If not on 24-hour duty, before leaving the room the gown should be removed, hands disinfected and the uniform put on outside in a small room or closet reserved for the purpose.

Never touch the face, hair, or lips without first disinfecting the hands. The care of different infectious diseases varies considerably and the special care of each will be carefully studied in the course on diseases. If possible, take a walk in the fresh air every day.

8. Before going into quarantine the nurse must not forget to select and have taken to the isolation quarters all articles that will be needed.

Suggestive list:—

Bedding.	Pails.
Clothing for patient.	Whisk broom.
Towels.	Tub.
Disinfectants.	Measuring glasses.
Soap.	Treatment articles.
Broom.	Charts—pen and ink.
Dust pan.	

9. Allow nothing to go from the sick room without being thoroly disinfected.

10. How to close a quarantine.

Patient:—

- a. Thoro bath of soap and water and hair shampoo.
- b. Wrap the patient in a clean sheet and blanket and take to another room previously prepared. Provide the patient with clean clothing.

Room:—

- a. Mattress, pillows and blankets are removed and placed so

that the fumes of the disinfectant can find an easy access to all parts.

b. All drawers, closets, and cupboards in the room should be left open.

c. Cracks around the room are sealed to prevent escape of the fumes.

d. Rooms may be disinfected with formaldehyde or sulphur.

Formaldehyde disinfection. Formula for 1000 cu. ft. of space: Place newspapers on the floor covering a large space. In the center of this place a large pail containing 8 oz. of permanganate crystals. When everything is ready pour over the crystals 20 oz. of formalin and make a rapid exit, sealing the door and keyhole from the outside. Formaldehyde gas does not tarnish or bleach articles.

Sulphur disinfection. This is not considered reliable but may be used if nothing else is available. Required, 4 lbs. of sulphur for every 1000 cu. ft. of space. Place the sulphur in a pan which is set upon several bricks in a tub containing water enough to cover them, the water being provided to avoid danger of fire from the burning sulphur. A liberal quantity of alcohol is then poured over the sulphur, and at the last moment before leaving the room a lighted match is applied, great care being necessary to stand well back from the pan and to avoid inhaling the sudden rise of fumes. Leave 24 hours.

The next day after fumigation when entering the room to open windows, take the precaution of covering the mouth and nose with a damp towel.

e. All infected dishes should be boiled 10 minutes.

f. Infected linen is put to soak in carbolic acid solution 1-20.

Nurse. Take a bath and hair shampoo. Put on clean clothes in another apartment. All clothing and outfit exposed to infection are left behind to be disinfected or fumigated.

Bed Sores

A nurse should guard against bed sores. They can usually be avoided. An exception to this may be found in the following conditions:—

1. Edema.
2. Paralysis.

3. Spinal injuries.

4. Continuous discharge from any part of the body.

As a rule, the development of a bed sore gives good ground for severe criticism of a nurse.

The first evidence to the patient of a bed sore is a stinging sensation and a feeling as if he were lying on something rough. The nurse should never wait for this report from the patient, but should watch continually and inspect daily the parts liable to be affected.

1. *Exciting causes*:—

- a. Continuous pressure.
- b. Friction between two surfaces.
- c. Moisture.
- d. Creases in under-sheet or night gown or rubber sheet.
- e. Crumbs in the bed.
- f. Lack of proper care or cleanliness.

2. *Predisposing causes*:—

- a. Malnutrition.
- b. Fat, flabby condition of flesh.
- c. Emaciation.
- d. Poor circulation.
- e. Old age.
- f. Fevers.
- g. Paralysis.
- h. Long confinement in recumbent posture.
- i. Edema.
- j. Irritating discharges.

3. *Parts susceptible*:—

- a. Hips, lower part of back, shoulders, heels. In these locations the bed sore is generally caused by pressure.
- b. Inner surfaces of knees, elbows, back of head. Generally due to friction.
- c. Those caused by malnutrition may appear any place where there is undue pressure. Often first appear in the form of pustules.

4. *Preventive measures*:—

- a. *Absolute cleanliness.*
- b. Removal of pressure.
- c. Light massage to parts.

- d. Rub with 50% alcohol.
- e. Dust with powder.
- f. Hot and cold applications may be given.
- g. If there is much moisture the part may be rubbed with any kind of oil.
- h. Keep the bed free from crumbs and wrinkles. Make it a rule to brush crumbs out of the bed after each meal.
- i. Place soft pads where there is friction.

5. *Treatment.* Report to the physician and follow his instructions in the case. If left to use your own judgment, the following measures may be employed:—

- a. Hot and cold applications.
- b. Wash with weak disinfectant solution,—
 - Green soap—1%.
 - HgCl₂—1—5000.
 - Boracic acid—sat. sol.
 - Carbolic—1%.
 - Pix cresol—1 tablet to four ounces of water.
 - Alcohol 95%, alum—sat. sol., or picric acid—sat. aqueous sol.
- c. Apply a soothing ointment (any of the following may be used):—
 - 1. Zinc ointment.
 - 2. Bismuth ointment.
- d. Apply sterile gauze and bandage.

Common Emergencies

FAINTING

If one feels the approach of a fainting attack, it is a good plan to bend from the waist lowering the head as far as possible. This position sends more blood to the brain.

Treatment:—

- 1. The head lowered and feet raised—the blood is thus sent back to the brain.
- 2. Provide abundance of fresh, cool air.
- 3. Loosen clothing about neck, chest and waist.

4. A little cold water dashed in face.

5. Smelling salts.

If consciousness does not soon return, external warmth must be applied and a physician should be sent for.

To distinguish fainting from hysteria.—In hysteria the pulse is normal. The patient resists any attempt to raise the eyelids. The body is warm. Practically no change of color in the face.

HYSTERIA

Dismiss the friends and spectators, as nothing is so conducive to a prolonged and severe attack as an audience.

If serious symptoms appear suggestive of other difficulties, send for the physician. Otherwise use such simple applications as a hot foot bath, fomentations to abdomen or spine, or a full warm bath to produce relaxation.

Suggestion is an efficient method of controlling attacks, but this and governmental methods had best be left to the head nurse or physician unless definite directions are given the nurse for their use.

EPILEPSY

Place the patient on the back with the head slightly raised. Loosen any tight clothing and see that he does not hurt himself. Provide abundance of fresh air. Place something between the teeth to keep him from biting the tongue. No attempt should be made to stop the movements.

DROWNING

1. Treatment, if the patient is still breathing when taken from the water:—

Remove, if possible, to a nearby house and give hot bath, or apply heat over the abdomen. Rub body briskly.

2. To restore the patient when life is apparently gone:—

a. Loosen clothing.

b. Open mouth, wipe it out.

c. Clear throat of mucus.

d. Turn patient face downward. Have the abdomen rest on coat or shawl folded. Make pressure on both sides of the throat, so as to force out any water that may have entered the air passages.

- e. Turn on back again and give artificial respiration.
- f. Wet clothing should be removed as soon as possible and warm blankets and bottles placed about patient.
- g. Alternate hot and cold applications given to the chest are good to aid in stimulating respiration.
- h. Keep up the artificial respiration for an hour or more if necessary.

SORDES

“Collections of brown or black material, consisting of accumulated debris from the epithelial layer of the mucous membrane of the mouth, darkened by drying, or by admixture with blood which oozes from the edges of the gums, form upon the teeth and lips at the height of severe cases of fever.”¹

It is the duty of the nurse to keep the mouth of the patient clean. When the patient is helpless and not able to assist in this procedure the nurse takes a small gauze sponge, or small squares of soft muslin, wraps it about the finger, dips it in a good mouth wash and cleanses the teeth and mouth thoroly. If the gums are not too sensitive, instead of using the finger, the artery forceps may be used to hold the sponge or cloth. After this cloth is used it is dropped onto a piece of paper and then others used until the mouth is thoroly cleansed. Then the pieces are wrapped in the paper and burned. The hands should then be scrubbed. Special attention should be given to the mouth at least three times daily, being especially careful that *every part* of the cavity is gone over.

Formulae for Mouth Washes

- I. Lemon juice ʒj.
Glycerine ʒj.
- II. Carbolic acid ʒj.
Listerine ʒij.
M. and put 1 tsp. in a 1/3 of glass of warm water.
- III. Essence of cinnamon gtt. x.
Water ʒ iv.

CHILLS

Stages of, —

- 1. *Cold shivering.* Apply heat—hot drinks.

¹ “Fever Nursing,” by Dr. J. C. Wilson.

2. *Hot*—elevation of temperature. Gradually remove heaters and extra coverings.

3. *Perspiration*. Wipe dry and avoid chilling. If perspiration is profuse the bed and body linen will have to be changed. Be sure that fresh linen is warmed.

Poisons

CLASSIFICATION:—

1. *Irritants*. Those which burn or irritate the tissues.
2. *Corrosives*. Those which destroy the tissues.
3. *Neurotics*. Those which act on the nervous system.

ANTIDOTES:—

1. *Mechanical*. Those which remove the poison entirely, prevent its action by dilution, or prevent its absorption.

2. *Chemical*. Those which neutralize the poison or unite with it to form a harmless compound.

3. *Physiological*. Those which counteract the effect of poison on the system.

In case of an irritant poison give an emetic or lavage, but where a corrosive has been swallowed there is danger in using this method as perforation of the stomach or oesophagus may occur.

Observe the following:—

1. Burns on face, hands, lips, etc.
2. Odor of breath.
3. Hemorrhage.
4. Nervous twitching of face, hands, or feet.
5. Rigidity.
6. Paralysis.
7. Urine, if any.

Emetics:—

1. Common salt $\mathfrak{z}\text{i}$ in $\mathfrak{z}\text{viii}$ of water.
2. Mustard $\mathfrak{z}\text{ss}$ in a glass of water.
3. Syrup of Ipecac $\mathfrak{z}\text{i}$ or ij .
4. Zinc sulphate grs. $\text{x} - \text{xxx}$ in $1/2$ glass water.
5. Apomorphine $1/10$ gr. by hypodermic.

I. IRRITANT POISONS

NAME	SYMPTOMS	ANTIDOTES
ARSENIC Paris green Scheele's green Rough on rats Fowler's solution Insect powders Donovan's solution	Pain in esophagus and stomach, metallic taste, nausea, vomiting and purging. Often bloody vomitus and fecal matter. Weak pulse, difficult respiration, great thirst, swollen face, cold extremities, cyanosis, convulsions, coma, and death,	Evacuate stomach by tube or emetic. Freshly precipitated ferric hydroxide or ferric hydroxide with magnesia. Stimulants, artificial heat.
CHLORINE Chlorinated lime Labarraque's solution Javelle water	Inhaled, causes irritation of larynx with edema which may result in asphyxia, cough, difficult breathing, and difficult swallowing. Swallowed, produces burning in stomach. May perforate.	Get patient into fresh air, Empty stomach by tube or by emetic like zinc sulphate, mustard, or ipecac. Ammonia gas inhaled or dilute ammonia by mouth. Raw white of egg. Stimulants, strong coffee.
COPPER Copper sulphate (blue vitriol) Copper acetate (verdigris) Copper cooking utensils	Metallic taste, pain in abdomen with griping. Nausea and vomiting. Purging of green material. Pulse weak and rapid. Urine diminished or suppressed. Coma.	Empty stomach with tube, using plenty of water. Emetic like mustard or ipecac. Potassium ferrocyanide, albumin, milk.
CROTON OIL	Severe abdominal pain, vomiting, purging. Pulse weak. Skin moist, prostration, collapse, death.	Empty stomach with tube. Use emetic as zinc sulphate. Gum arabic or white of egg, to protect. Artificial heat, camphor, stimulants for heart.
FORMALDEHYDE Formalin	Inhaled.—Intense irritation of mucosae, dyspnoea, pain in head, sense of suffocation. Swallowed.—Pain, nausea, vomiting, dyspnoea, vertigo, rapid pulse, urine suppressed, collapse.	Fresh air, stimulants. Ammonia, apomorphin, demulcents.
IODINE Tincture iodine Lugol's solution	Pain in throat and stomach. Metallic taste, thirst, vomiting, purging. Face pale, urine suppressed. Pulse weak and rapid. Cyanosis, excitement, convulsions, collapse.	Empty stomach, demulcents. Starch paste, sodium thiosulphate. Stimulants, artificial heat.

LEAD Sugar of lead White lead Red lead Goulard's extract	Dry throat, thirst, metallic taste. Pain in abdomen, cramps. Nausea, vomiting. May be either purging or constipation. Rapid, weak pulse. Convulsions, coma, death. In chronic cases blue line on gums, wrist drop, lead colic.	Empty stomach by tube. Soluble sulphate, such as magnesium sulphate or sodium sulphate. Sulphur baths, potassium iodide, electricity.
MERCURY Bichloride Red precipitate White precipitate	Gastro-enteritis, metallic taste. Salivation. Pain in throat, esophagus, stomach. Nausea and vomiting, purging. Bloody stools. Cold extremities, coma, collapse, death. In chronic form, line on gums, teeth loose, tongue swollen, breath foul.	Empty stomach if vomiting has not occurred. White of one egg to four grains of the bichloride. Stimulants, external heat.
PHOSPHORUS Matches Rat poison Phosphorus pills	Odor of Phosphorus, garlic taste in mouth. Burning pain in stomach. Vomiting of luminous material. Jaundice, headache, dizziness, scanty and albuminous urine. Convulsions, coma, death. Post mortem shows fatty degeneration of liver and other organs.	Empty stomach, avoid fats and oils. Copper sulphate, potassium permanganate, hydrogen peroxide. Oxygen, artificial heat.
PTOMAINS	Variable. Thirst, nausea, vomiting; convulsions by some, sleep by others.	Empty stomach, demulscents. Tannic acid. Combat symptoms as they arise.
SILVER Silver nitrate Lunar caustic	Pain, nausea, and vomiting. Vomited material turns black in light. Purging, dizziness, convulsions, paralysis, coma, collapse.	Evacuate stomach by tube or emetic. Sodium chloride (common salt), albumins. Stimulants, external heat.
ZINC Zinc sulphate Zinc chloride	Corrosion of lips and mouth. Pain and burning in digestive tract. Vomiting and nausea. Convulsions, paralysis, collapse.	Empty stomach with tube or emetic like ipecac. Albumin, alkaline carbonates. External heat.

II. CORROSIVES

- CARBOLIC ACID** Pain and burning in mouth and stomach. Sometimes vomiting, whitening of lips and mouth. Dyspnoea, dizziness and loss of consciousness. Urine small amount and black. Collapse, death.
- Empty stomach by emetic and tube. Avoid fats and oils.
- Alcohol, magnesium sulphate, syrup of lime, albumin.
- Atropin. Stimulants, external heat, artificial respiration.
- CAUSTIC ALKALIES**
- Caustic soda Pain in mouth and stomach. Pain on swallowing. Vomiting and purging of mucus and blood. Skin cold and clammy. Feeble pulse, stupor, coma, and death.
- Caustic potash
- Concentrated lye
- Strong ammonia water
- Lime
- Carbonate of soda
- Carbonate of potash
- If signs of corrosion, avoid use of stomach tube and emetics. Use demulscents to protect mucosa after giving chemical antidote.
- Dilute vegetable acids freely, such as citric and tartaric, lemon and orange juice, vinegar, milk, oil.
- Stimulants, artificial heat.
- MINERAL ACIDS**
- Hydrochloric acid Pain along entire digestive tract, thirst, difficult swallowing. Vomited material dark colored and containing shreds of membrane.
- Sulphuric acid
- Nitric acid
- Nitro-hydrochloric acid
- Feeble pulse, clammy skin, collapse. Hydrochloric produces white stain on tissue, sulphuric acid a corroded black appearance, nitric and nitro-hydrochloric a yellow stain.
- Do not use stomach tube or emetics. Avoid water in case of sulphuric unless it can be given in large amounts as it generates heat and increases injury.
- Other cases use water freely and demulscents.
- Magnesia, soap, albumin, lime water, whiting, wall plaster. Avoid carbonates, as they liberate carbon dioxide and may rupture stomach wall.
- Stimulants, external heat, oil enemata. Protect external parts like ordinary burn.
- OXALIC ACID**
- Oxalic acid Hot, sour taste in mouth. Burning sensation in esophagus and stomach. Intense thirst. Headache. Tongue swollen. Vomiting of acid, bloody mucus. Cold skin, coma, collapse, occasionally convulsions. Urine scanty and albuminous.
- Potassium oxalate
- Potassium binoxalate
- Avoid use of stomach tube. Emetics may be used in most cases. Safer to induce vomiting by irritating fauces with feather. Castor oil and magnesium sulphate to empty intestinal tract.
- Lime in any form such as chalk, whiting or plaster. Magnesia is also of value. Caustic alkalies of no value so far as poison is concerned.
- Stimulants.

III. NEUROTICS

ALCOHOL Ethyl Alcohol Whiskey Brandy Rum	Confusion, giddiness, relaxation of body, hallucinations, stupor, anesthesia, weak pulse, skin cool and moist, pupils dilated, breathing noisy, may be convulsions. Odor of alcohol on breath.	Fresh air. Empty stomach by tube or emetic. Chemical antidote, none. Artificial heat. Support by aromatic spirits of ammonia. Galvanic current, hot and cold applications, oxygen.
ANTIPYRETICS, COAL TAR Acetanilid Phenacetin Antipyrin	Sweating, depression, cyanosis, collapse.	Put patient in recumbent position. Loosen clothing. Evacuate stomach with tube or emetic. Chemical antidote, none. Artificial heat. Artificial respiration.
BELLADONNA Tr. Belladonna Extract Belladonna Atropin	Dryness in mouth and throat. Great thirst, dilated pupils. Indistinct vision, giddiness, dry skin, nausea, vomiting. Stupor. May be excitement. Coma, death.	Evacuate stomach by tube or emetic. Tannic acid. External heat, stimulants.
CHLORAL Chloral Chloral hydrate	Loss of muscular power. Sleep, coma, weak respiration, weak pulse, first slow then rapid and thready. Face white and sweaty. Temperature low. May be delirium.	Empty stomach by tube or mustard emetic. Liquor potassae 1-2 to 2 drams in glass of water hourly as required. Oxygen inhalation. Cold to head. Inhalation of ammonia.
ANESTHETICS Chloroform Ether	Stertorous breathing, irregular and shallow. Dilated pupils, conjunctival reflex absent. Same when taken by mouth as when inhaled.	Remove anesthetic if being inhaled. Artificial respiration. Empty stomach by tube. Chemical antidote, none. Cold water in face and on chest. Atropin sulphate 1-100 gr. hypodermatically. Friction and external heat.
CARBON MONOXIDE	Dizziness, headache, may be nausea and vomiting. Pupils dilated. Choking, gasping, collapse.	Remove to fresh air. Artificial respiration. Chemical antidote, none. Oxygen inhalation, heat to extremities and body. Heart stimulants like cold to chest.

COCAIN

Cocain hydrochlorate

Nervous excitement, sense of oppression, and fulness in head. Sometimes nausea and vomiting. Pulse slow, respiration labored. Face may be cyanotic. Pupils dilated, cold extremities. Convulsions, coma, death.

Fresh air, patient in horizontal position. Artificial respiration. Empty stomach if cocain was swallowed.

Chemical antidote, none.

Stimulants for heart and respiration. Cold compress to chest. External heat. Oxygen inhalation. Cathartic and enema.

DIGITALIS

Tr. digitalis

Extract of digitalis

Infusion of digitalis

Vomiting, purging, headache, eyes bulging. Blue sclerotics; vertigo; salivation; pulse small, slow, irregular; face pale. Suppression of urine, delirium, convulsions. Coma, death suddenly.

In horizontal position. Evacuate stomach by tube or emetics. Wash stomach with tannic acid solution.

Chemical antidote, none.

Epsom salts, stimulants like ammonia.

HYDROCYANIC ACIDHydrocyanic acid
Potassium cyanide

Breath odor of bitter almonds. Respiration difficult, pulse imperceptible. Eyes prominent. Pupils dilated. Convulsions, asphyxia, cyanosis, paralysis, collapse, coma, death.

Artificial respiration. Evacuate stomach after antidote.

Ferrous sulphate. Hydrogen peroxide.

Cold water over face. Stimulate with ammonia. Artificial heat, electricity.

IODOFORM

Iodoform

Drowsiness, slight delirium, high temperature, rapid pulse, meningeal symptoms.

Remove iodoform dressings if in use.

Chemical antidote, none.

Stimulants.

NUX VOMICA

Tincture nuxvomica

Extract nuxvomica

Strychnin

Sense of suffocation. Difficulty in breathing. Stiffness about neck. Tetanic convulsions. Opisthotonos, great anxiety. Jaw muscles affected late. Death.

Empty stomach early before convulsion.

Tannic acid, potassium permanganate.

Artificial respiration. Chloroform for convulsions. Neutral bath, bromides, chloral.

NICOTIN

Nicotin

Languor, numb feeling in head, confused mind, nausea, cyanosis, dilated pupils, convulsions, coma.

Evacuate stomach by tube or emetic like syrup of ipecac.

Chemical antidote, none.

Stimulants like caffeine and ammonia, alternate hot and cold douche, oxygen inhalation, electricity.

OPIUM	Mental excitement,	Artificial respiration,
Tr. opium	headache, drowsiness	evacuate stomach.
Extract opium	then sleep. Contracted	Potassium permanganate,
Camphorated tinct.	pupils, reflexes lost.	tannic acid.
opium	Cyanosis, muscular re-	External heat. Keep pa-
Morphin	laxation, clammy skin,	tient awake by external
Codein	weak pulse, coma,	stimulation.
Heroin	death.	

NOTE—This table is compiled from Brundage on Toxicology.

PART II

SURGICAL NURSING

This course in Surgical Nursing should be preceded by lectures on the following topics:—

- I. History of Bacteriology.
- II. Classification of Bacteria and their Relation to Surgery.
- III. Immunization.
- IV. Sterilization and Disinfection.

THE PATIENT

Preparation of the Patient's Room

Furniture. Iron surgical bed, a dresser, washstand, bed-side table, stand, two chairs, and a screen. Curtains, if any, should be of light, washable material. Rugs are never allowed.

If, in a private home, use the same directions in the selection of a room that are observed in medical nursing. The following is the ordinary daily routine in cleaning a surgical room and keeping it in order:—

1. Wipe woodwork and furniture with a lightly oiled cloth, the object being to prevent dust in the air.

2. Wash crockery—drinking glasses, drinking pitcher, washbowl and pitcher, soap dish and slop jar.

3. Change bed linen—generally one sheet daily is sufficient. Air blankets. Turn mattress if patient can be moved to a cot or a wheel chair.

4. Wash floor with a disinfectant or strong soapsuds of laundry soap. During the day keep floor free from dust by occasionally wiping it with a broom that is covered with a cloth or bag.

5. Do not forget to keep finger marks wiped off the bed. Also do not forget to keep electric light bulb washed and shining, also the shade.

6. Change towels on stands and dresser as often as needed.
7. Remember that fresh flowers always bring good cheer and sunshine into the sick room.
8. Use one of the dresser or washstand drawers for the sterile bowls and dressings.
 - a. Put clean towel in the bottom.
 - b. Arrange dressings and bowls in an orderly manner and as soon as the dressing wrappers are no longer needed return them to their proper place.
9. The urinal and bedpans should be scrubbed *thoroly* and disinfected *daily*. Also after using they should be thoroly rinsed. If these utensils are not properly cared for they will soon have a characteristic odor, and stains will be in evidence.
10. Bowls should be washed daily and those that come in contact with a wound or raw surface, such as a repaired perineum, should always be disinfected before using.
11. Have on hand a cloth for the floor, one for woodwork and furniture, one for the crockery and one for the bedpan. Those should be washed and dried and labeled after using, otherwise a relief nurse is apt to use one of them for a wrong purpose. These little precautions take very little time and result in quite a saving of linen and old cloth.
12. Do not neglect to clean drinking tube daily with a brush especially made for that purpose.
13. A surgical nurse should systematize the daily routine. If this is done much time and labor are saved. A patient appreciates a nurse who is a good housekeeper. Avoid being "fussy" and "puttering" in the performance of your duties. Plan ahead and make *every* move *count*.

Preparation of the Patient

The routine of preparation varies in almost every hospital in many details, but the general plan is practically the same. The head nurse should receive from the surgeon in charge the details of the preparation and see that his orders are carried out.

MAJOR OPERATIONS

1. *General directions.* Simple methods for the preparation of the patient are now being considered very favorably. The following is an example of such a plan:-

Pills, a saline cathartic, or two ounces of castor oil, also a bath are given the afternoon or evening preceding the operation. A light supper is sometimes allowed.

The next morning the patient is shaved and at the appointed hour walks to the operating room, if able to do so. Here the special preparation of the skin area involved in the incision is made just before the operation. Perhaps a still better plan is to shave the patient the afternoon or evening preceding the operation, omitting enemas or other tedious procedures on the morning of the operation.

If the iodine method of preparing the field of operation is to be used, the bath should be given and the shaving done the previous afternoon. The first coat of iodine may be applied in the evening after the skin has thoroly dried.

2. *Diet.* The day before, the patient may be allowed to partake of his ordinary diet, omitting highly proteid foods, pastries and coarse vegetables. A light supper may be allowed the night before unless the operation is of such a nature that this would be inadvisable. No food should be given on the day of the operation unless the work is to be done late in the afternoon.

3. Head nurse sees that a specimen of urine is saved and examined one or two days before the operation.

4. Hair shampoos and other tedious procedures should be given two days before the operation.

5. If the operation is gynecological and vaginal douching is ordered, it is well to give this the previous night. Unless otherwise ordered, employ a 1% green soap solution at 108°, followed by douching with plain water at the same temperature.

6. *Shaving field of operation.* Get the shaving tray from surgical supply room. It should contain the following articles:—

- a. Shaving soap.
- b. Small piece of gauze for applying soap before shaving.
- c. Razor (safety preferred).
- d. Pair of blunt end scissors.
- e. Bowl of warm water.

Clip hair from the part. Make soap lather, apply, and shave. The head nurse will give directions as to the extent of the area to be shaved.

The skin should never be scrubbed to the point of irritation, as a raw surface furnishes a good medium for the growth of

bacteria. Also in shaving, exercise great caution to avoid irritating the skin. Strong disinfectants act as irritants, and are to be used with care and never upon sensitive surfaces such as the eye, labia, etc. When these surfaces are being prepared for operation, special care should be observed not to overdo the cleansing process.

7. Put on clean gown, slippers and bath robe; braid hair in two braids; put to bed between clean sheets.

8. Give glass of fruit juice, gruel, or malted milk.

9. On the morning of the operation the following things are to be observed just previous to the operation:—

a. Record temperature, pulse, and respiration.

b. Remove the false teeth.

c. Have the patient urinate just before entering the operating room.

d. In laparotomy catheterize if ordered.

e. Surgical jacket or gown, stockings, leggings, etc., should be put on the patient before the anesthetic is begun.

f. The nurse must not fail to have the patient ready before the hour appointed for the operation.

Special preparation to part,—

This is generally done in the operating room. If done in the patient's room the same aseptic precautions are observed.

1. Place blanket and clean sheet over limbs.

2. Place Kelly pad under patient.

3. Place some impervious material that has been disinfected around edges of area to be scrubbed to protect the blanket and gown from getting wet.

4. The clean nurse now places sterile towels over the impervious material. Then she takes in each hand a sterile sponge. The circulating nurse pours over these and also the part to be scrubbed, sterile water and tincture of green soap. The clean nurse scrubs thoroly but avoids scrubbing to the point of irritation, as this makes a fertile field for the growth of bacteria. The green soap is rinsed off the part about 3 to 5 times during the procedure. The clean nurse next scrubs the area with alcohol and then ether, special attention being given to the umbilicus. If alcohol and ether are applied when the patient is conscious, the process is apt to be very painful. After this is done

a sterile towel is placed by the clean nurse over the disinfected area and then the Kelly pad and rubber and wet towels are removed.

5. A sterile sheet, folded so as to make four thicknesses, is now placed over the limbs, folding several inches over the blanket. A sterile half sheet is then folded and placed over the arms, tucking in well over the gown.

6. The sterile laparotomy sheet is then placed over this.

7. Place sterile anaesthetic shield over frame provided for that purpose.

Iodine preparation to part.—Formula:—

Iodine 30 gms.

Potassium iodid 40 gms.

Aq. Dest. 500 c.c.

Dilute with an equal volume of grain alcohol. For the satisfactory action of the iodine, it is essential that the skin be dry. If possible, shave the night before the operation. If shaving is done just before the operation, or the day of, dry skin thoroly with towel and apply ether; then dry again. In regular cases, the iodine preparation is first done in the ward, the iodized area is then covered with a sterile pad or towel. Before commencing the operation a second application of the iodine solution is made, the skin then being in a thoroly dry condition. If possible, it is well to make the first application of iodine the night before the operation. The second application is made just before the patient enters the operating room or on the operating table. Some surgeons prefer to use 5% tincture of iodine.

Position of the patient on the table.

I. Dorsal. The patient is placed upon the back with pads under the back and knees. Thus the strain that the lumbar spine and sacro-iliac joints are generally subject to, is avoided. The unnatural position of the body on an operating table often causes post-operative back-aches and a subsequent weakening of the sacro-iliac joints.

II. Trendelenburg position. Place the patient in the dorsal position with the shoulders resting against shoulder supports. Then lower the head of the table as much as required. The arms should be fastened loosely across the chest.

III. The lithotomy position. Place the patient in the dorsal position. Flex the thighs on the abdomen and the legs on the thigh with the knees separated. The buttocks should project well over the edge of the table.

IV. The exaggerated lithotomy position. This is similar to the above, except that the pelvis is elevated. This may be done by placing a large flat sand-bag beneath the buttocks or by combining with the Trendelenburg.

V. The kidney position. Place in either the right or the left Sim's position as is needed. Then raise the "kidney lift" of the table until the patient is in the proper position. If a table has no "kidney lift," an oblong sand-pillow may be placed between the table and the patient in the proper place.

THE OPERATING ROOM

The operating room should be on the top floor and have a high ceiling. The sky-light should be double, air tight, and of ribbed glass, and shaded so that the sunlight will not fall directly upon the operating table. A north exposure is considered the best.

The floor, walls, and ceiling should be tiled, or the floor of cement and the wall and ceiling of smooth, hard wall plaster. The corners should be round and the heat should be either hot water or steam.

General rules. There should be no confusion in an operating room. Avoid unnecessary talking. Each member of the staff should have a thoro knowledge of his own duties and also of the duties of others. Each movement should be executed quickly and noiselessly and without coming in contact with others.

Preparation of the Operating Room

1. Every inch of space in the room is first washed thoroly with soap and water.
2. All furniture is washed with a reliable disinfectant, e. g.
HgCl₂ 1/1000.
Carbolic 2%.
Lysol 1%.
Formaldehyde 1%.

In addition to this the glass of the tables may be washed with 95% alcohol, also the electric light bulbs. It is preferable to have two operating rooms—one for aseptic and one for septic cases. However, we do not always find this ideal arrangement. Consequently, after each septic case the room should be sealed up and thoroly fumigated. Full directions for this are given elsewhere.

Technique of Tables

1. *Anesthetic table* (To the right of the anesthetist):—

- a. Place towel over top.
- b. Chloroform bottle.
- c. Ether mask.
- d. Two towels.
- e. Mouth sponges.
- f. Pus tray containing mouth gag, tongue forceps, and artery forceps.
- g. Bottle of vinegar (some anesthetists give inhalations of this at the close of the anesthetic to prevent nausea).
- h. Tube of vaseline.
- i. Such other articles as the anesthetist may require.

2. *Table of clean nurse.* The following classes of articles should be arranged on the table according to some definite plan. In one place put needles and sutures, near to this such special instruments as scissors, needle holders, cervical, perineal, and aneurysm needles.

Reserve a place for the instrument to be used in the particular operation to be done. These should be placed as needed. In the movable instrument tray, which is attached to a foot. on another place on the table put the sponges and such sterile dressings as may be needed. Have in a convenient location on the table sterile safety pins, small sterile beakers or bottles containing such liquids as tincture of iodine, tincture of benzoin, carbolic acid, alcohol, and sterile vaseline. Also have a package of sterile cotton pledgets and applicators. On the shelf underneath are kept sterile sheets, towels, napkins, and a reserve supply of sponges and dressings, also sterile dishes and rubber gloves.

3. An extra table in the corner contains supply bottles of alcohol, carbolic, etc., a supply of packing of various sizes in

glass tubes, wide-mouthed bottles or other convenient receptacles, tray containing articles for final preparation of the field of operation. These articles vary according to the technique used. The following is a suggestive list. The tray should be set up according to the order of the surgeon.

- a. Large sponges.
- b. Tincture of green soap or green soap solution.
- c. Sterile water.
- d. Alcohol.
- e. Ether.
- f. Tincture of iodine.

4. An adjustable standard for holding the irrigating apparatus is needed in every operating room. The irrigating cans and tubing must be sterile before using.

5. A special stand holding one or two bowls of sterile hand solutions are placed near the surgeon. These are used by him for washing his hands as may be necessary during the operation.

Duties of Staff

After the operating room is thoroly cleaned according to the outline given elsewhere, one nurse scrubs and prepares herself according to one of the formulae given under "hand disinfection."

Another nurse who does not have to be clean and who is commonly called the "circulating nurse," places on the clean nurse a cap. She also unpins and turns back the wrapper of a surgical gown without touching the gown and nurse No. 1 takes it out and puts it on, No. 2 tying the tapes in the back and pinning the belt.

No. 1 does not touch anything that is not sterile and No. 2 is careful not to touch anything that is sterile. If this rule is not adhered to, the whole operating room technique is rendered imperfect, and as a result a life may be sacrificed. It is very true that a chain is no stronger than its weakest link, so a surgical technique is just as strong as its weakest point.

No. 1 and No. 2 are now ready for work in the operating room. No. 2 unpins and turns back the outside wrapper of a bundle and No. 1 unpins the second wrapper and removes it when needed.

First a sterile sheet is placed over the table used by clean nurse. Then dressings, supplies and dishes are arranged so that they may be readily secured.

While she is doing this No. 2 sets the anesthetic table and the general table.

THE DUTIES OF THE "CLEAN NURSE" (NO. 1) AT OPERATION

1. As a general rule No. 1 is the nurse in charge of the operating room.

2. Places laparotomy sheet over the patient, after placing sterile towels or sheets over the edges of the sheet and blanket that are already on the patient.

3. Helps to hand instruments.

4. Washes soiled instruments.

5. Keeps plenty of sterile sponges on hand for the surgeon.

6. Counts laparotomy sponges and napkins.

7. Prepares sutures and threads all needles.

8. Anticipates the needs of the surgeon and his assistant.

9. Watches the whole staff to see that the surgical technique is not broken. If it is, she sees that steps are at once taken to mend the broken link.

THE DUTIES OF THE "CIRCULATING NURSE" (NO. 2)

1. Changes solutions as needed.

2. Runs the irrigator.

3. Sees that all supplies are kept up.

4. Under No. 1, number 2 is responsible that everything in operating room is kept in order during an operation.

5. Anticipates the needs of all the staff.

6. Should stand on the alert, ready to assist in any way possible.

Hand Disinfection

1. Trim the nails as short as possible and clean them.

2. With green soap or some special brand of soap, selected by the surgeon, the hands and arms to above the elbows are to be thoroly scrubbed. This requires about ten minutes, during which time the parts should be frequently rinsed (five or six times).

3. *Chemical disinfection* follows the last rinsing. For this various methods are in vogue.

I. a. Hot saturated solution of *potassium permanganate*, until the parts are well stained.

b. Saturated *oxalic acid* solution to decolorization.

c. Warm sterile water.

II. a. Acid solution of *bichloride of mercury* for five minutes.

b. Sterile water.

III. a. Cover parts with paste of *chloride of lime* and water.

b. Apply *sodium carbonate*.

c. Remove very carefully all this mixture with *bichloride of mercury* 1/1000, using a piece of sterile gauze.

d. Immerse in alcohol.

e. Rinse in solution of 1% carbolic acid.

To facilitate the removal of lime and soda mixture, the hands and arms may be immersed in a 2% solution of sodium carbonate.

IV. *Alcohol* (70% or 75%) for two minutes.

There are various modifications of these methods. Some prefer to finish any method by rinsing the hands in bichloride. Others after simple scrubbing with green soap or mechanic's soap, rinse the hands with sterile water and then immerse in Harrington's solution 30 seconds to one minute, and finally rinse in alcohol.

Formula for Harrington's solution,—

Grain alcohol	640 c. c.
Water	300 c. c.
Hydrochloric acid C. P.	60 c. c.
Bichloride of mercury	0.8 gm.

Some surgeons find it impossible to use strong chemicals on the hands because of the resulting irritation and dermatitis, and hence use very simple methods, depending largely upon mechanical cleanliness.

Sterilizing Room

1. General preparation the same as for the operating room.

2. A tripod or side table contains three or four bowls for hand solutions also a bowl of nail brushes and files that are immersed in a solution of formaldehyde 2% or green soap 2 1/2%, and a package of sterile, surgeon's towels.

3. The stationary bowls for the scrubbing of the hands are scrubbed with bon ami, or some good cleaning preparation, and the faucets and drain pipes are polished. This room contains a general work table.

Instruments and Supply Room

The general preparation of this room is the same as the sterilizing room. It contains the sterilizer, tanks containing hot and cold sterile water, a tank for boiling bowls, etc., an instrument boiler, also the instrument case, the cupboard for surgical dressings, a cupboard for general supplies, and a work table.

Methods of Sterilization

RUBBER GLOVES

No. 1. Dry method. Soak new gloves in soap and water for twenty-four hours; boil for five minutes. This is to render them pliable: rinse, dry on both sides; powder on inside, being careful to shake powder out of finger tips. Mate the gloves.

Inside the wrist of each glove place a piece of gauze, and a piece lengthwise between each pair of gloves to prevent them sticking. Put each pair up separately in muslin or towel, mark with owner's name, and sterilize for twenty minutes under ten pounds pressure.

After each operation, cleanse gloves on inside and outside by scrubbing with soap and water, rinse, test, and mend. Boil five minutes in 1/4% soda sol., rinse in ammonia water, dry on inside and outside, powder and proceed as before. If seamless gloves are used, it is best to powder them on both sides, as they stick together.

To be used after thoroly disinfecting hands; dry with sterile towel, powder hands (not gloves) with sterile talcum and draw on gloves.

No. 2. Wash thoroly in green soap and water; rinse. Boil 5 minutes in saline or soda solution. Immerse in 5% green soap solution or HgCl_2 1—3000. Fill gloves with solution so that they may be easily and quickly put on.

BRUSHES

Hand brushes and nail cleaners are boiled 15 to 20 minutes and then placed in a solution of 2% formaldehyde or 5% green soap.

The Kelly pad is washed thoroly with soap and water and disinfected in 5% carbolic or bichloride 1-1000. The objection to the latter is that it blackens rubber.

Drainage tubes are washed thoroly in green soap and water and rinsed. Boil one-half hour just before using.

Gutta percha tissue is immersed in HgCl_2 1-1000, one-half hour before using.

Rubber sheets are disinfected in 5% carbolic acid solution.

SUTURES

Catgut is made from the intestines of sheep. It is softened and absorbed by the fluids of the body and hence it is used within the abdominal cavity or deeper layers of tissues.

In many hospitals this is purchased from firms who prepare it for use and put it up in glass tubes containing alcohol.

There are various formulae for preparing it. These may be found in any text on surgical nursing.

Kangaroo tendon is prepared from the split sinews of the tail of that animal. Its advantage over catgut consists in its greater strength.

Silkworm gut is generally prepared by boiling one-half hour before an operation. It is seldom employed as a buried suture, but is much used in closing wounds with interrupted sutures.

Silk and linen are prepared for use in the same manner.

DRESSINGS

Small sponges—6x9 in. Fold each edge of the longest dimension to the center. Then bring the ends together at the center. Fold again so that a perfect square is formed.

Large sponges—9x18 in. They are made the same as the small sponges.

Large laparotomy napkins. Gauze, 36x36 in. When finished the dimensions are 12x16 in.

Rollers. Gauze, 36x36 in.; finished, 34x4 in.

Laparotomy napkins. Gauze, 36x18 in.; finished, 16x8 in.

Abdominal dressing. Gauze, 30x36 in.; folded, 16x8 in. Combination. Gauze, 30x20; cotton, 16x12; finished, 16x12 in. Fluff, 6 pieces, 18x18 in.

Perineal dressing. Cotton, 4x6 in.; Gauze, 12x9 in. Finished, 4x6 in.

Perineal pads. Gauze, 12x18 in.; Cotton, 5x9 in. Finished, 5x9 in.

The towels, napkins, rollers, abdominal dressings, sheets, perineal dressings and pads, are done up in packages containing 6, 12 and 24 each. The large sponges are done up in packages of 12 and 24 each.

Surgical gowns, sheets, dressings, towels, napkins, laparotomy sheets, are all wrapped in two heavy muslin wrappers and sterilized for one hour under fifteen pounds pressure. This kills the spores as well as the bacteria, so that fractional sterilization is unnecessary.

PACKING

One-fourth inch. Cut strip of gauze 1 inch wide. Pull a thread to cut by, to make it perfectly even. Fold each edge to the center lengthwise, then bring the outer edges together. This makes a strip $1/2$ of an inch in width and four thicknesses of gauze. Pack in a glass test tube or a small wide-mouthed bottle, and place a stopper of absorbent cotton. Label and sterilize in the usual manner.

In making any width of packing, the strips are cut five yards long. The width of the gauze should be four times the width of the packing when finished.

IODOFORM GAUZE

Formula,—

1. Alcohol 3 parts.
2. Glycerine 2 parts.
3. Iodoform sufficient to make the consistency of cream.

One nurse scrubs up as for an operation. We will call her No. 1 and her assistant No. 2.

No. 1 takes a sterile cotton pledget and No. 2 pours on it a little alcohol. No. 1 then wipes the edges of the glycerine bottle, being careful that her fingers touch nothing but the pledget.

No. 2 measures out the glycerine and alcohol into a sterile graduate and pours into a sterile bowl. She then pours in the iodoform powder while No. 1 stirs with a sterile spoon until the solution is of the consistency of cream. No. 2 then removes the plug from a tube of sterile packing while No. 1 with sterile forceps removes the same and puts in the solution already made.

Here she saturates the gauze with the solution, being careful that the iodoform is evenly distributed thru the gauze. Then the gauze is wrung dry and packed into a sterile tube as before, a sterile plug being placed.

INSTRUMENTS

Surgeons differ in regard to sterilization of instruments. The following method is highly approved by many surgeons:—

Have a 1% solution of sodium carbonate boiling in the instrument boiler. Wrap the instruments in a towel and drop in. Boil for one-half hour. The sodium carbonate helps to prevent rusting.

All edged instruments to be boiled should be wrapped in cotton. Knives and scissors should be immersed in carbolic 95% for five minutes and then rinsed in sterile water and dipped in boiling water. If left for a longer time in the carbolic or if boiled, they lose their temper and are apt to rust.

When the instruments have boiled sufficiently, the clean nurse dries them on sterile towels and places them on trays ready for use.

If perchance an instrument should fall to the floor, the “circulating” nurse picks it up, and if it happens to be one that is much needed, it is washed and rinsed and then immersed in carbolic for five minutes. It is then rinsed in sterile water and is ready for use.

After the operation the instruments should be taken apart, washed in cold water to remove blood and pus and any particles that may be adherent. Scrub thoroly with green soap, being careful not to neglect any crevices or niches. Boil for fifteen minutes in 1% sol. of sodium carbonate. If the case has been a “clean” one, boiling is omitted, as this is done before the the next operation anyway. Dry thoroly, wrap all knife blades and sharp-edged instruments in absorbent cotton, and then put away.

DISHES AND UTENSILS

Wash with soap and water and dry. Boil 20 minutes or wrap in pillow cases or towels and sterilize in the usual manner in the autoclave.

The “circulating nurse” should always handle dishes by taking hold from the outside, never inside or over the edge.

SOLUTIONS

In the part on "Solutions" the system of calculating quantity and proportion is fully taken up. In this connection only the technique of sterilizing solutions will be considered.

NORMAL SALT

It is better to make this solution fresh whenever it is needed. Keep sterile saturated solution on hand or the sterile tablets.

Take a sterile enamel bowl and measure out with a sterile measure the required amount of sterile water needed. If the tablets are to be used, with sterile forceps place in the water the number of tablets needed to make a normal salt solution. If the saturated solution is used, measure out of flask or bottle the amount needed into a sterile graduate and pour into water. Heat this to the proper temperature and pour into whatever receptacle has been prepared.

In many hospitals the sterile normal salt is kept on hand ready for immediate use. Into a clean flask pour a normal salt solution from which all particles and sediment have been removed by steaming, filtering, or letting stand until all sediment has settled to the bottom and then decant the upper portion.

Place stoppers of sterile cotton plugs and sterilize by boiling one hour on three successive days.

STERILE SATURATED SOLUTION OF SALT

Salt saturates 1—2 1/2. Take an enamel pail. Place in it 1 part of salt and 2 1/2 times as much water. Skim often when boiling. Boil 1 hour, after which let it stand until cool. Take a sterile bottle and place in it a sterile funnel. With a sterile dipper, put solution in the bottle, pouring from the dipper thru the funnel. Place a sterile plug.

STERILE GLYCERINE

Place an uncovered glass jar filled with glycerine in the sterilizer. Beside it put the lid. Sterilize for one hour under fifteen pounds pressure. If no sterilizer is at hand, use a double boiler and keep the water boiling under the glycerine two hours. Sterile vaseline and other oils are prepared in the same manner.

TINCTURE OF GREEN SOAP

Green soap 3 parts.
 Alcohol (95%) 2 parts.
 Ether 1 part.

Mix ingredients in a pitcher and stir briskly for a few minutes every hour until a solution is formed.

Suggestive Operative Record

Date

Name Address

Friend or relative

Diagnosis

Operation proposed

Preparations required—Usual Special

Condition of patient on morning of operation

Urine—amount Sp. Gr. Urea gm. Alb. Sugar Casts

Blood—Hem. R. C. W. C. Heart T. P. R.

Anesthetic begun Anesthetic employed Anesthetist

Amount used Hypodermics given

Operation begun Completed Incision

Sutures

Drainage Packing Dressings

Amount blood lost—great considerable little none

Condition of patient at end of operation

Description of operation

.....

.....

.....

.....

.....

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Surgeon.....

Assistant

Packing removed..... Drainage removed.....

Sutures removed

Daily record

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Preparation for an Operation in a Private Home

LOCATION OF ROOM

1. Select a room that has an abundance of clear light.
 2. Avoid if possible a room where sun will shine directly upon the operating table during the operation.
- Discuss the following with the surgeon beforehand:—
- a. The matter of the source of light.
 - b. The anesthetic.
 - c. Means of ventilation.
4. Choose a room as near the bedroom of the patient as possible.
 5. If necessary to use patient's bedroom for an operating room, prepare the bed and push it into the corner out of the way.

PREPARATION OF ROOM

1. If there is sufficient time remove all hangings, draperies, carpets, rugs, and all unnecessary furniture.
2. Thoroly scrub floor and walls.
3. If there are just a few hours before the room is to be made use of, it is better not to disturb anything—not even to sweep the floor. Cover all pictures, hangings and large pieces of furniture with sheets wrung out of a solution of HgCl_2 1-1000. The floor should be similarly covered. Under sheets about operating table place newspapers or heavy papers to pre-

vent the floor underneath from getting stained with blood, etc. Pin or tack sheets to side walls to a height of five or six feet.

FURNITURE

1. Operating table. Generally kitchen table or ironing board is made use of. Two small tables can be placed together. Pull apart an extension table and lay two boards on the leaves lengthwise across the gap. Pad with blanket and cover with rubber sheet and freshly laundered sheet.

2. Four small tables for instruments, anesthetics, dressings, and solutions.

3. Place for surgeons to scrub up. This is preferably done in a room adjoining, but of course this is not always possible.

Wipe all furniture with an oiled cloth. Scrub when old and dirty. Cover tables with sterile towels.

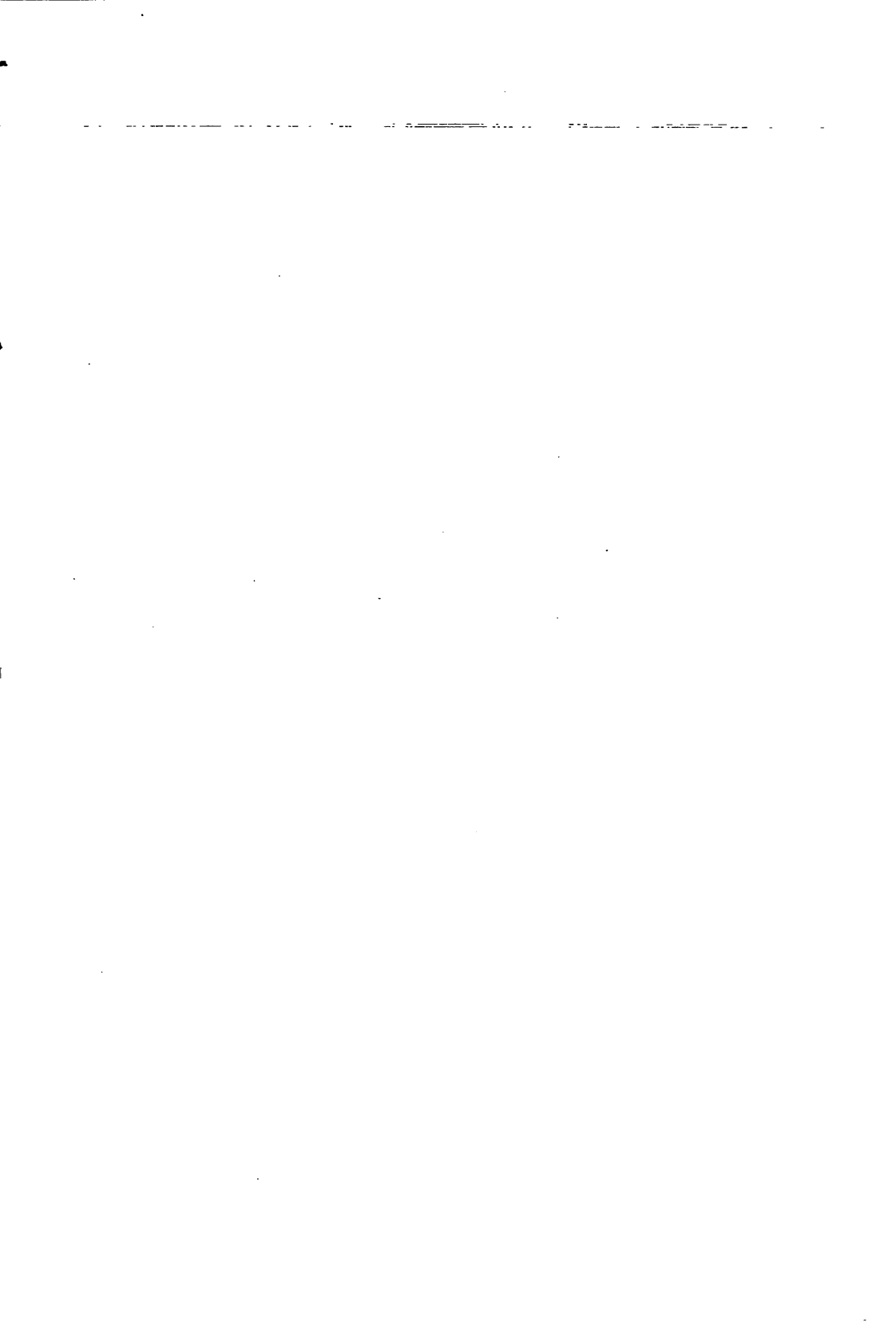
SUPPLIES NEEDED

1. Dishes:—

- a. Three large basins.
- b. Two large pitchers.
- c. Three small basins.
- d. One small pitcher.
- e. Four small glasses.

Scrub thoroly with soapsuds. Rinse and boil one-half hour before operation. If this is not possible, let them stand in 1-1000 HgCl₂ at least one hour before operation.

2. Fountain syringe.
3. Rubber sheeting for table.
4. Foot tub for soiled sponges.
5. Large pail for dirty solutions, etc.
6. Plenty of hot and cold sterile water.
7. Safety pins.
8. Absorbent cotton.
9. Alcohol.
10. Sterilized dressings, sheets, gowns, and plenty of towels.
11. Four wooden nail brushes.
12. Antiseptic solutions as ordered.
13. A Kelly pad can be improvised by tightly rolling a blanket and covering with a rubber sheet, two ends of which are to be pinned together and thus the solution will flow into the receptacle below.



The surgeon brings his own instruments and the anesthetic, also rubber gloves.

AN EMERGENCY STEAM STERILIZER

Use an ordinary wash boiler. Place in bottom a crate made of three light boards placed edgewise and a few slats nailed across. The crate should be six inches above the bottom of the boiler. Pack parcels in loosely so that the steam will circulate freely in and around them. Have water boiling in bottom of boiler and sterilize for 1 1/2 hours. Take parcels out and dry either in the sun or in an oven. If placed in the latter they will need to be watched very carefully as it is easy to scorch or burn them.

Anesthetics and Anesthesia

As a rule nurses have very little to do with the giving of anesthetics more than assistance, altho in some hospitals nurses having had special preparation and experience are given charge of administering anesthetics. It is, however, necessary that the nurse understand the general effects of anesthetics and something of their mode of administration and under what circumstances they are used.

1. *General anesthetics.* Those most frequently employed are ether and chloroform. They produce unconsciousness and general insensibility to common sensations including pain. They are used in nearly all major and many minor operations.

2. *Local anesthetics.* These are such substances as cocaine and ethyl chloride, which when applied locally produce anesthesia in the part to which they are applied. They are used in minor surgery, operations upon the nose and throat, lancing of boils, etc.

3. *Spinal anesthesia* is carried out by means of such substances as stovain, tropacocain, etc. It produces anesthesia in all parts below the region of injection.

ETHER

Ether by the modern drop method is considered the safest of all general anesthetics. In many hospitals it is being used almost exclusively. When begun slowly and given in an even, uniform manner, there is less difficulty in securing prompt anesthesia and much less disturbance on the part of the patient

than when given by the old closed inhaler system. As ether is very inflammable, it is dangerous to have an open flame anywhere near while it is being administered. It is a stimulant to the heart and respiration, so that the force of the pulse wave is somewhat heightened. As with other anesthetics the patient passes thru three stages, (a) the exciting stage, (b) light anesthesia, (c) profound (or surgical) anesthesia. The length of the exciting stage will depend somewhat upon the condition and temperament of the patient. It is apt to be rather prolonged and troublesome in those addicted to alcohol. For major operations the third stage must be attained. For this reason this stage is often spoken of as that of surgical anesthesia.

Points relating to the elimination of ether are considered under "After Treatment."

CHLOROFORM

Chloroform produces more prompt anesthesia, must be given with more air, and is more depressing to the heart than ether. While it is still used much as a general anesthetic for adults, especially for brief operations, in some hospitals it is being used only in infants for such operations as hare-lip, cleft palate, etc. Chloroform is also much more toxic than ether, and occasionally results in degeneration of the liver or kidneys. On the other hand ether is said to be somewhat more irritating to the respiratory mucous membranes.

NITROUS OXIDE

Nitrous oxide, very commonly called laughing gas, is used mostly by dentists for such brief work as tooth extraction. When mixed with oxygen it is comparatively safe, in even somewhat longer operations and is often used for curettage.

COCAIN

For injection cocain is usually employed in a one or two per cent solution. As an ingredient of Schleisch solution it is used for what is called infiltration anesthesia. It is also often combined with adrenalin for injection or application to the mucous membrane. In applying alone to the mucous membrane it is used in from 2 to 10 per cent solution. A pledget of cotton is dipped in this, applied to the mucous membrane to be anesthetized, and left in place for a few minutes.

Dry cocain powder is sometimes applied to the mucous membrane after the application of adrenalin. This is frequently done in operations upon the nose. Toxic effects are sometimes observed, such as headache, nausea, vomiting, weak pulse, talkativeness, or delirium. These are usually, however, of no great consequence.

ETHYL CHLORIDE

This is a highly volatile substance which is sprayed upon the part to be anesthetized. By a rapid evaporation it freezes the part, and so may be used in lancing boils, carbuncles, etc.

SURGICAL AFTER-TREATMENT

Kinds of Operations

The following are some of the more important operations which are designated by special terms: The list is necessarily very incomplete.

Arthrotomy. The incision of a joint cavity.

Arthrectomy. The excision of the articular ends of the bones entering into the formation of the joint.

Appendectomy. Removal of the vermiform appendix.

Caesarean section. Removal of usually living child by abdominal incision.

Cholecystectomy. Excision of the gall bladder.

Cholecystotomy. Incision of the gall bladder.

Cholecystostomy. Incision of the gall bladder with formation of a fistula.

Curettage. Scraping of a cavity, especially the uterine cavity.

Enterorrhaphy. Suture of the intestines.

Gastroenterostomy. The formation of a fistula between the stomach and intestines.

Herniotomy. The repair of a hernia.

Hysterectomy. Excision of the uterus.

Laparotomy. Abdominal incision for any operation on internal organs.

Lithotomy. Incision of the bladder for the removal of the stone.

Mammectomy. Excision of the breast.

Nephrectomy. Excision of the kidney.

Nephropexy. Fixation of a floating kidney.

Nephrorrhaphy. Suture of the kidney.

Oophorectomy. Removal of ovary.

Oophorosalphingectomy. Excision of an oviduct and ovary.

Oophorohysterectomy. Excision of ovaries and uterus.

Panhysterectomy. Removal of uterus and all its appendages.

Perineorrhaphy. Suture of the perineum.

Prostatectomy. The removal of the prostate gland.

Salpingectomy. Excision of a Fallopian tube.

Salpingoophorectomy. Excision of an oviduct and ovary.

Thyroidectomy. Excision of the thyroid gland.

Tonsillectomy. Excision of the tonsils.

Trachelorrhaphy. Suturing of the neck of the uterus (cervix uteri).

Transfusion. Transfer of blood directly into the veins from one person to another.

Trephining. Making of an opening thru the bones of the skull.

Turbinectomy. The excision of a portion of a turbinate body.

Major Operations

GENERAL CARE

1. Keep patient quiet and warm.
2. Watch the pulse almost continuously for the first two or three hours and record frequently. Later record T. P. R. every three hours.
3. Measure and record the amount of urine. Save for the first 24 hours for analysis, and afterwards as ordered.
4. Have a pus tray at hand in case of nausea. The nurse may resort to the following measures for the relief of nausea without an order from the physician:—
 - a. Ice bag or cold compress to throat.
 - b. Inhalations of vinegar or camphor.
5. Place cotton pillows under the knees to relieve strain, also have pillows of different shape and size to tuck in here and there to make the patient comfortable.
6. Keep lips moist and cleanse mouth frequently.
7. Water drinking. It is now considered good therapy and in general highly advisable to give water freely in small amounts as soon as the patient is conscious. A glass of hot water is considered best at first, following this with hot or cold water as the patient desires. Ice water or chipped ice should not be given unless ordered. The first water given may produce vomiting, but as this washes out the stomach and hence relieves nausea and vomiting, it is considered beneficial. The free use of water aids in the elimination of the ether and helps to prevent kidney complications.
8. Cathartics and enemata. The giving of cathartics soon

after operation is meeting with less favor than formerly. Cathartics and enemata should be given only as ordered.

9. Follow strictly all the orders of the physician.

10. Watch for symptoms of shock, or other complications that are liable to arise. Watch for indications of hemorrhage, and where this may be external, inspect the dressings over the field of operation very frequently and, if the slightest evidence is seen, report at once.

11. Do not fail to describe accurately all discharges.

12. See things to do and anticipate the needs of the patient. Put yourself in his place, and do your best to make him just as comfortable as possible.

13. Give sponge bath or similar treatment daily. Soap wash three times per week.

14. Keep bedding dry and free from crumbs and wrinkles.

15. Give preventive treatment for bed sores.

16. *Dressing of wounds.* Before the hour appointed for the dressing of a wound or the removal of stitches, see that a tray containing the following articles is in readiness:—

a. Package of sterile napkins.

b. Small bowl of disinfectant and one of sterile water or normal saline, if needed.

c. Sterile instruments.—Scissors, artery forceps, thumb forceps.

d. Package of small sponges and also one of pledgets.

e. Package of dressings.

The nurse places a table by the bed of the patient. On this she places newspapers and over these clean towels. On the table she places the tray of disinfectant for the hands. She then places a wastebasket by the table with a newspaper in the bottom.

The nurse, after scrubbing her own hands, unpins the bandage and turns it back. Then she unties the tapes holding the dressing. Next she unpins the sterile packages on the tray, turning back the wrapper containing the surgical napkins, so that she can get them easily. She then scrubs her hands in disinfectants on the table, places sterile napkins about the wound, turns back the outer dressing (cotton pad), and is then ready to assist the surgeon. She is very careful not to touch anything that is surgically clean without disinfecting her hands.

After the dressing, the nurse ties the tapes and replaces the bandages. All soiled dressings are tied up in the newspapers at the bottom of the wastebasket and burned. The tray is then returned to its proper place.

The above is a description of an average dressing. Under certain conditions many other things may be needed and all these are to be ascertained by the nurse. She must ever be on the alert and quickly anticipate the needs of the surgeon.

17. To prepare the patient for removal of stitches or for the changing of dressings, see first that all necessary articles are in readiness. Move the patient near to the edge of the bed. Unpin the bandage and turn it back. Untie the tapes over the dressings, and surround the field with sterile towels. When ready, it is usually the duty of the nurse to remove the outer cotton pad so that the surgeon need touch nothing not likely to be sterile.

18. In all major operations the patient should never be left alone until thoroly conscious and responsible.

ABDOMINAL SECTION

1. Directly after operation many operators order a warm enema of normal salt to be retained. It is very beneficial because it relieves the thirst which follows abdominal operation; stimulates the kidneys, and has a general stimulating effect.

2. Do everything possible to encourage the passing of urine without catheterization. Use the catheter only when ordered, and always with the strict aseptic precautions as a cystitis following operation is unusually troublesome.

3. The accumulation of gas is quite common after laparotomy. To relieve this, pass a rectal tube about four inches and let it remain. In obstinate cases get orders from the surgeon. For this condition the saline, asafoetida, or turpentine enema is frequently used.

4. Allow no visitors except by order of surgeon.

5. Slight rise of temperature the day following is very common, and is spoken of as surgical fever.

6. Allow the patient to sit up in bed or to walk only by order of the surgeon.

7. Food is withheld from twenty-four to thirty-six hours. During the first week a liquid diet is generally used.

8. The bowels should move the third day.

9. When there is drainage in an abdominal wound the patient is obliged to stay in bed three or four weeks, or until healing takes place. When first allowed to get up he should be cautioned against any exertion such as lifting or stooping, as any strain on the scar may produce hernia.

PERINEORRHAPHY CASES

1. The first twenty-four hours' treatment is the same as for abdominal section.

2. The bowels should move once daily after the second day.

3. Care should be taken that the stitches are not torn apart. Keep the knees close together.

4. Never catheterize without orders.

5. Always cleanse the parts after urination. Spraying of the stitches with hot saline solution or the alternate hot and cold spray is very beneficial. Oftentimes the wound is washed off with sterilized cotton held with forceps and dipped in a disinfectant solution. Wipe dry with bits of cotton held in the same way, and apply some soothing and antiseptic powder.

6. Dress the wound according to the order of the surgeon. The nurse should get explicit instruction in regard to this.

7. Watch the stitches for evidences of anything that may need attention from the surgeon.

TRACHELORRHAPHY

1. Encourage urination without the use of the catheter.

2. The first packing is usually removed on the second day.

3. After the removal of the packing, hot disinfectant douches should be given as ordered.

GALL BLADDER CASES

In cases of cholecystostomy, that is, where there is temporary drainage of the gall bladder, special care of the drainage tube and bottle or other receptacle for the bile, is required. See that the bottle is so placed that it will receive the bile without soiling of the dressings or bed linen. See that it is not suspended alone by the drainage tube but is fastened to the abdominal bandage by tapes. The bottle should be emptied from time to time as is necessary, and thoroly cleansed to prevent the unpleasant odors of decomposing bile. After the removal of the drainage tube, which usually occurs on the eighth to the



eleventh day, the dressings have to be changed very frequently. Large pads of absorbent cotton, covered with gauze, may be provided for this purpose. The excoriation of the skin about the biliary fistula may be prevented by gentle washing away of the bile and the application of a very small amount of talcum powder. In case there are additional drainage tubes beside that going into the gall bladder, the patient must remain on the back until the openings left by these latter have entirely closed.

PROSTATECTOMY CASES

Prostatectomy and lithotomy are done by either the perineal or the suprapubic route. It is practically always necessary to leave in the bladder a double flow drainage tube, thru which the bladder is kept constantly irrigated for the first two or three days, or until the return flow ceases to be bloody. In case clots stop the opening in the larger return tube, it will be necessary to aspirate them by the reverse action of a piston syringe. The irrigating can should be just high enough to secure an easy flow without undue pressure. At intervals the bladder is irrigated with some antiseptic solution, such as 1—20,000 silver nitrate. In these cases about 15 gr. urotropin daily is administered by mouth in divided doses. It is a very efficient and practically the only reliable urinary antiseptic.

Because of the fact that this operation is always done in old men, the patient is encouraged to sit up as soon as possible, and even before that he should be allowed to turn from side to side so as to prevent hypostatic pneumonia.

CASES OF ABSCESS DRAINAGE

In cases where an abdominal or pelvic abscess has been drained, the use of continuous proctoclysis by the Murphy method is highly recommended. If the constant presence of the tube in the rectum is overly irritating, the saline solution may be given by intermittent proctoclysis—a half pint or more at a time. This not only helps to maintain blood pressure, but is said to have a very beneficial effect in flushing the drained surfaces thru the absorbents. The directions for proctoclysis are given elsewhere.

Surgical Complications

SURGICAL SHOCK

Surgical shock and hemorrhage are the two most serious

surgical complications which occur on the operating table. The symptoms of the two are very much alike; that is, weak, thready pulse and cold, clammy skin. With the treatment of hemorrhage on the operating table the nurse has very little to do, with the exception of assisting in the giving of saline solution by hypodermoclysis, or possibly very rarely by direct vein infusion. Following the operation where the patient has lost much blood, the surgeon frequently orders saline solution by continuous proctoclysis. The method of giving this is described elsewhere.

In case of surgical shock much of the treatment may be carried out by the nurse directly under the physician's direction. The condition is said to be due most largely to a temporary paralysis of the vasomotor center. Various other theories are given, with which we need not concern ourselves here. Surgical shock very readily responds to vigorous cutaneous stimulation by means of briefly applied hot applications quickly followed by the cold mitten friction. This may be carried out by the following plan:—

“The effectual treatment of shock requires the attention of two persons. On the appearance of the symptoms of shock, immediately place the patient's feet in hot water, care being taken that the water is not nearly hot enough to produce a burn; or quickly apply well-wrapped fomentations so as to cover both feet and legs to the knees. As soon as the parts have been well warmed and reddened, remove the hot application and quickly administer to the same parts a cold mitten friction. The water used should be ice water, and the friction most vigorously given. The mitts should be dipped 2 or even 3 times, another attendant holding the limb while it is being treated. The skin is now dried and rubbed with a coarse Turkish towel and immediately covered with a warm dry blanket. The thighs should be treated in the same manner, also the arms. While this is being done and beginning at the same time as the first treatment to the limbs, intense and quickly alternating hot and cold applications should be made to the anterior surface of the chest and especially over the precordia. This may be done by removing the ice bag from the precordia, which should have been placed there when the pulse first became unduly rapid, and after rubbing the skin briskly, applying a very hot but well covered fomentation. This should

not be left in contact with the skin longer than 15 or 30 seconds. Next, rub the chest with a flat smooth piece of ice, using quick to-and-fro movements and wiping away the water with a Turkish towel. After this another fomentation is applied, again followed by the ice. These alternations should be repeated 3 or 4 times, after which the well-covered ice bag should again be placed over the heart."¹

In addition to the above, administer 8 oz. to 1 pint of hot saline solution by hypodermoclysis or by rectal injection, or both.

The hypodermic use of strychnin and other "heart stimulants" has been shown to be productive of more harm than good, and results in a deeper degree of shock. This is particularly true of strychnin, as it is an irritant to the vasomotor center.

HEMORRHAGE

While the nurse has very little to do with the treatment of hemorrhage on the operating table, in case the hemorrhage occurs after the removal to the room, the life of the patient may be dependent upon the keen observation and prompt action of the nurse in charge. Hemorrhage following operation usually occurs within the first few hours, altho it may occur later. Those cases which are most serious are where the hemorrhage is internal, so that the field of operation and dressings give no indication of the condition. It is well, however, to keep close watch of the dressings during the first six or eight hours following operation. Internal hemorrhage is marked by a sudden fall in the temperature, rapid, thready pulse, and a profuse cold sweat. There are also pallor, thirst, an anxious expression, and faintness. If the patient has come out from under the anesthetic the eyes may be bright and the mind clear. If these symptoms appear, the surgeon should be summoned at once. In the mean time the head should be kept low, in some cases the foot of the bed raised. The patient should be kept absolutely quiet, and heat applied to the extremities. It is usually best not to stimulate the circulation to any great degree until after the hemorrhage is stopped. Following this a saline enema, continuous proctoclysis, hypodermoclysis, and water drinking are the measures necessary to supply the loss of fluid. In the event of any serious complication, as hemorrhage, the nurse should maintain the utmost quiet and calm. Nothing is to be

1. Abbott, "Hydrotherapy," p. 232.

gained by informing the patient of his condition or allowing him to observe any anxiety on the part of the nurse.

WOUND INFECTION

1. *Superficial infection and stitch abscess.* Bacteria are practically always present in the epidermis, so that it is a very difficult matter to prepare a field that is absolutely devoid of bacteria. The most common germ is the staphylococcus albus. Under certain conditions this germ multiplies and produces more or less difficulty with healing. Among the conditions favoring skin infection are bruising of the tissues either in the preparation of the operative field or in the operative technique. Very tightly tied sutures are also sometimes responsible for an infection.

Perhaps the most common cause of wound infection is low vitality of the tissues themselves. The collection of blood underneath the skin or between the edges of the wound may also give rise to infection. Sometimes infection may be present without giving rise to symptoms. Generally, however, there is slight pain in the wound and a moderate rise of temperature. Upon inspection of the wound surface swelling and redness are usually detected. Infection generally occurs somewhere from the third to the seventh day following operation. As wound infections are always attended to by the surgeon, the nurse has very little to do, with the exception of calling attention to anything that may appear suspicious. Careful note of these items should also be made on the record.

A stitch abscess may be due to germs present on the skin surface, irritation caused by the suture material, or to imperfectly sterilized sutures. Where stitch abscess occurs, it is necessary to remove the stitch. Stitch abscesses are usually of no great consequence.

2. *Deep infection.* Of the various causes of deep infection poorly prepared sutures, especially catgut, are frequent; also the collection of blood or serum thru imperfect hemostasis or wound drainage. In operations upon infected organs some of the pus or secretions may soil the wound surface. In deep infections there is a rise of temperature, usually between 101 and 103 degrees. There is greater pain and swelling than in superficial infections. These may occur within 4 or 5 days, or even as late as the second week.

Deep infections are always to be cared for by the surgeon. Usually the nurse in such event is only to follow very closely any special instructions that may be given.

PNEUMONIA

Pneumonia was formerly supposed to be more frequent after the use of ether than of chloroform, but with ether given by the modern drop method this statement is hardly applicable. The most important causes of pneumonia following an operation are: congestion of the lungs due to the exposure of the patient on the operating table or soon after, prolonged operations, operations upon aged patients, and long confinement in the dorsal position following operation. It is perhaps unnecessary to mention that pneumonia is very common in those patients who have previously had some infection of the respiratory tract. Pneumonia should be very carefully guarded against by seeing that the patients limbs and chest are well covered during the operation, and especially that the feet are warm; also that proper jackets are used following the operation. After the patient has been removed from the operating table it is an excellent plan to make some hot application to the feet and legs, such as a hot foot bath, fomentations, or the hot pack. Some surgeons highly recommend the use of the ice bag or cold coil to the chest, shoulders and all other parts being well covered during its application. This other is not applicable in old people nor in those under average vitality, and is best applied during the application of the heat to the feet and legs.

The onset of pneumonia may be marked by frequent respiration, pain, and a rise of temperature, together with undue rapidity of the pulse. It may occur within 24 or 36 hours after the operation or be delayed as long as two or three weeks.

PERITONITIS

The onset of peritonitis is marked by pain and extreme tenderness in the abdomen. The abdomen is likely to be distended with gas (tymanites), the limbs are drawn up, and the pulse becomes rapid and wiry. The beginning of a rise of temperature from 101 to 103 may be marked by chills or chilly sensations. There is often vomiting, and the constipation is obstinate. The patient is restless, and complains of feeling very weak.

In all cases the treatment will be directed by the surgeon. Among the measures that are used are the warm enema, and in case of pelvic peritonitis a hot vaginal douche is frequently prescribed. Perhaps the most efficient measure is the application of the hot hip and leg pack, with one or more ice bags to the abdomen. This usually lasts about thirty minutes and is followed by a cold mitten friction to all parts covered by the hot applications, with the exception of the abdomen. This may need to be repeated two or three times a day. The ice bags to the abdomen are often left in place between treatments. All directions should be very carefully followed, as the mortality of peritonitis following operation is very high.

INTESTINAL OBSTRUCTION

Intestinal obstruction is usually first indicated by pain in the abdomen, or tympanites. The pulse may first be increased in tension, but later becomes very rapid and weak. Soon after the appearance of pain vomiting begins, first of food and later of fecal matter. Obstipation is always present. The appearance of pain and tympanites, and always the appearance of uncontrollable vomiting, should be indications for prompt notification of the surgeon. In conditions where the character of the operation does not make it inadvisable, the thoro cleansing of the bowels by soapsuds enema followed by the giving of a glycerine epsom salts enema by high bowel catheter, is usually ordered. All these treatments should be very carefully but persistently carried out.

SEPTICEMIA

Septicemia is a general toxic condition caused by the absorption of septic products. Its onset is marked by severe chills, which may be repeated, high, irregular fever (intermittent type), rapid, bounding pulse, sometimes also by vomiting. The treatment varies according to the source and location of the infection. Such hydiatic treatments as cold mitten friction, which increases leucocytosis, are highly beneficial. Friction or massage should never be applied to any part immediately involved.

CYSTITIS

Cystitis is an inflammation of the bladder. It is often caused by an infection carried in by a catheter, altho it may be due to other causes, such as a pre-existing infection.

Pain over the pubes, painful and frequent micturition, are evidences of its existence. The urine is usually cloudy from presence of bacteria, and in some cases may contain more than small amounts of mucus and pus. When cystitis occurs, urotropin is usually ordered, also hot boric acid, bladder irrigations, or the use of other mild antiseptic. Fomentations to the lower abdomen and pubic region afford much relief by relaxing the the spasm of the bladder.

There are many other complications that may arise in surgical cases. Among the more serious of these are uremia, tetanus, erysipelas, and pyemia. Fortunately, however, the latter three are very rare.

Procedures of Special Use in Surgical Nursing

HYPODERMOCLYSIS

Definition. The hypodermic injection of large amounts of fluid. Hypodermoclysis is usually given over the chest, abdomen, thigh, arm, or between the shoulder blades.

1. Articles needed:—

- a. Irrigator, preferably a glass one that is graduated.
- b. Two long hypodermic needles.
- c. Tubing.
- d. Sterile normal salt solution.
- e. Collodion.
- f. Small beaker of alcohol.
- g. Package of sterile cotton pledgets.
- h. Package of sterile napkins.
- i. Bowl of disinfectant for hands.

2. *Procedure.* It is absolutely necessary that all the apparatus used be properly sterilized. This is generally kept sterile and ready for use at a moment's notice.

After the tray is set and everything ready, the one who is to give the hypodermoclysis scrubs up thoroly. She then scrubs with alcohol the part where the needle is to be inserted. Next the hands are disinfected and the sterile napkins placed about the area. Then the solution is allowed to run thru the needle so as to exclude all air, and then the needle is inserted.

If given in the breasts, it is a good plan to connect the apparatus so as to give it in both breasts simultaneously. For this two needles will be required. From 500 to 1000 c.c. of physiologic salt solution are generally injected at a time.

When the amount of solution desired has passed into the tissues the needles are carefully withdrawn and the point of insertion sealed with cotton and collodion.

INTRAVENOUS SALINE INFUSION

This is always done by a physician.

1. *Indications*.—

- a. Shock.
- b. Loss of large amount of blood.
- c. Suspension of the functions of the kidneys.
- d. Toxins in the blood where rapid elimination is desired as in septicemia and delirium tremens, also diabetic coma.

2. *Technique*. Area. Median basilic or the median cephalic vein at the bend of the elbow.

A constricting bandage is placed around the upper part of the arm so as to obstruct the return flow thru the superficial veins. The skin over inner surface of elbow is disinfected thoroly and the vein is bared and cleared for about one inch. Two ligatures are passed around it, one above the point of intended opening and one below. A small valve-like opening is then made in the vein, and a small irrigator point is introduced, first allowing some of the fluid to pass thru it, in order to guard against the entrance of air. The upper ligature is tightened around the irrigator point, holding it in place and also preventing leakage.

The lower ligature is tied, closing the vein below. The bandage is now removed.

The jar containing solution should be about three feet above vein. The solution generally used is a physiologic salt solution.

After a sufficient amount of solution has been introduced into the blood, the skin is sutured and a sterile dressing applied and held by adhesive. Every precaution is taken in this procedure to have all apparatus, field of operation, dressings, etc., surgically clean.

PROCTOCLYSIS

Proctoclysis is administered for the purpose of steady, gradual introduction of fluid into the system. The large bowel will absorb in the neighborhood of two to three pints in the course of two hours. It is given chiefly after the institution of pelvic or abdominal drainage for abscess, but is also of great



benefit in hemorrhage and following shock. The fluid should be administered thru a fountain syringe to which is attached a three-eighths inch rubber hose with a hard rubber or glass vaginal douche tip with multiple openings. This tube should be flexed almost to right angles, three inches from its tip. A straight tube must not be used, as the tip produces pressure on the posterior wall of the rectum when the patient is in the Fowler's position. The tube is inserted into the rectum to the flexion angle and secured in place by adhesive strips, binding it to the side of the thigh so that it can not come out; the rubber tubing is passed under the bedding to the head or foot of the bed, to which the fountain is attached.

Two or three inches from the fountain syringe interpose a Y-tube, and to the upper limb attach a piece of rubber hose of the same size as the outlet tube. Fasten the free end of this to the top of the fountain syringe so that what returns thru it will fall into the container. When flatus is voided, the gas passes more readily thru the upper tube than directly into the fountain syringe. This reduces the pressure at such times and so aids in preventing expulsion of the fluid onto the linen.

The fountain syringe should be suspended from six to fourteen inches above the level of the buttocks and raised or lowered to just overbalance hydrostatically the intra-abdominal pressure, *i. e.*, it must be just high enough to require from forty to sixty minutes for one and one-half pints to flow in, the usual quantity given every two hours. *The flow must be controlled by gravity alone, and never by a forceps or constriction on the tube*, so that when the patient endeavors to void flatus or strain, the fluid can rapidly flow back into the can, otherwise it will be discharged in the bed. *It is this ease of flow to and from the bowel that insures against over-distension and expulsion onto the linen.*

The fountain had better be glass or graded can, so that the flow can be estimated. The temperature of the water in the fountain can be maintained at 100° by encasement in hot water bags. The fountain is refilled every two hours with one and one-half to two pints of solution. Instead of the usual solution, a teaspoonful of calcium chloride may be added to the pint of saline solution. The tube should not be removed for two or three days if necessary.¹

¹ Abbott, "Hydrotherapy," pp. 294, 295.

ACCIDENTS AND MINOR SURGERY

Wounds

Wounds are of various kinds, and according to the instrument causing the wound and the character of the wound itself, they may roughly be classified as follows: contusions, contused wounds, incised wounds, lacerated wounds, punctured, poisoned, infected, and gunshot wounds.

CONTUSIONS

Contusions are not necessarily associated with breaking or opening of the skin. They are commonly spoken of as bruises, and are wounds of soft tissues caused by blows, etc. If taken early, these should be first treated by the application of the ice bag or cold compress, to prevent the undue extravasation of blood into the tissues. Later on, they are best treated by alternate applications of heat and cold, in order to favor the absorption of the blood and restore the vitality of the tissues. In applying the cold in the first stage, it is often beneficial to use running cold water, as it is more grateful than the cold compress.

CONTUSED WOUNDS

These are actual breaks in the tissue accompanied by bruising. There is always more or less hemorrhage into the surrounding tissues, while some tissue nearest the break in the skin has been crushed and must be removed. It is also necessary to thoroly cleanse the wound from dirt and foreign matter. It is well also to apply some mild antiseptic at first, and it may be necessary to wash with antiseptics at intervals to keep the wound from suppurating. Applications of heat and cold may be made in much the same manner as with simple contusions, altho it is well in cleansing the wound to use warm or hot water. Ointments are usually best omitted, and the wound dressed with either very mild antiseptic solutions or dried and treated with powder, etc.

INCISED WOUNDS

These are simply plain cuts without bruising or laceration

of the tissue. Where they are large and the edges gap, stitches should be used. Before stitches are applied, or in case the wound is too small to require sutures, the surface should be thoroly cleansed and disinfected, after which they should be dressed with plain sterile gauze.

LACERATED WOUNDS

A lacerated wound is a wound in which the tissues have been torn and show many ragged edges. These are often so poorly supplied with blood as to slough away in a few days. Lacerated wounds are most frequently caused by accidents with machinery, dull tools, etc. All ragged, torn edges should be trimmed off with scissors or knife so that the surfaces are smooth. They should then be washed and cleansed with antiseptic solutions the same as with contused wounds. They may also need to be dressed with very weak antiseptic solutions from time to time, otherwise it is well to keep the parts as dry as possible, as wounds heal better and the epithelium grows over the surface much more rapidly where this is done.

Because of the laceration of the tissue there are often little recesses where germs may lodge and grow. Where such lacerated wounds are received because of blank cartridges and other Fourth of July "paraphernalia," or where soiled with street dust, it is best to wash thoroly with peroxide of hydrogen, injecting it into all possible recesses so as to prevent growth of the tetanus germ.

PUNCTURED WOUNDS

Punctured wounds are most frequently due to pins, nails, tacks, thorns, etc. These are often harmless and require no treatment whatever. On the other hand they are occasionally the source of very grave difficulties such as blood poisoning and lock jaw (tetanus). For this reason if the instrument or object causing the wound is known or suspected to be dirty, the wound should be most thoroly treated. Germs are carried into the tissues often to quite a depth. Since the sharp point leaves very little opening the germs grow very rapidly at the depth away from the air, and in case of nail punctures of the foot are very likely to be the cause of lock jaw. Since the germ of tetanus will not grow in the presence of oxygen, if the wound is deep it is well to lay it open by means of a knife and thoroly

inject with peroxide of hydrogen. This liberates oxygen in the wound and so prevents the growth of the tetanus germ. Nail punctures acquired about a barn yard are especially dangerous, as tetanus germs are much more numerous in such places. If there seems to be the least danger from this source, the person having the wound should be given injections of tetanus antitoxin, as a prophylactic.

GUNSHOT WOUNDS

Whether received in the head, trunk, or limbs, these wounds are always serious, and especially so when they involve vital organs. The item of first importance is to stop all visible hemorrhage and use means to overcome shock, if it be present. The person should be kept at rest and the surgeon summoned at once. Internal hemorrhage often continues in these wounds especially when received in the chest or abdomen. Where symptoms of internal hemorrhage make their appearance, and there is no surgeon at hand, it is best to bandage the limbs next to the body in order to prevent undue loss of blood. Also lower the head of the patient, to prevent enemia of the brain and fainting. The application of ice directly over the wound may in some cases stop the hemorrhage or prevent excessive hemorrhage. Foreign particles and pieces of clothing should be removed from the wound, and antiseptics applied over the surface to prevent further infection.

POISONED WOUNDS

This term may very conveniently be applied to wounds inflicted by insects, the bites of dogs, snakes, and other animals. In case of bites by venomous snakes, return circulation should be shut off by tight bandage close above the wound. As it will take a few minutes to do this, the part should be quickly grasped by the hands and held so tightly as to prevent all return of the blood. At the same time the poison and blood should be sucked out of the wound and this sucking repeated several times so as to get rid of all the poison that it is possible to remove in this way. It is well to rinse out the mouth afterward, altho the venoms are usually inert in the alimentary tract. The wound may now be treated by peroxide of hydrogen or rubbing into it crystals of permanganate of potash. These agents oxidize the poisons and so render them harmless. Cauterization either

with a hot iron or chemical agents is always recommended in order to destroy the venom. In the case of bites, the stings of bees, wasps, centipeds, tarantulas, spiders, etc., remove the sting and apply ammonia water and then a cold compress. The harmful effects are usually in proportion to the individual susceptibility. Some persons have a special predisposition to much pain and excessive swelling following the bites of certain insects or spiders.

INFECTED WOUNDS

The symptoms of infection usually appear in two, three, or four days. Infection of wounds is most common where the instrument or object inflicting the wound is dirty. Sometimes these are found in spicules of bone, butchers' knives, etc., where men are working in packing houses, nail punctures, and scratches from thorns, etc. There is pain, redness, swelling, and the feeling of heat in the part. This condition is usually spoken of as blood poisoning, altho this term had perhaps better be reserved for something more than local infection. Real blood poisoning (septicemia) is indicated by the extension of red lines centrally from the infected part. These are due to the spread of the bacteria and the extension of the infection along the lymphatics. They are signals of immediate danger, and whenever they appear the infected part should be most vigorously treated. The wound should be kept open, and where there are indications of pus it may be necessary to make additional incisions. The part should then be treated by alternate hot and cold pours or immersion. This should be carried out by means of the hottest water that it is possible to be born on the skin, and the temperature increased from time to time to the limit of duration. Cold applications should consist of ice water; chunks of ice should be kept in the water used. In the case of hot and cold immersion, the part should be left in the hot water about two minutes and placed in the cold for twenty or thirty seconds. It should then be returned to the hot for two minutes and again in the cold for twenty or thirty seconds. These alternations should be kept up from thirty minutes to an hour at a time, and repeated from one to four times daily until the infection is under control. In case of the hot and cold pour, the duration of each phase may be somewhat less than that mentioned above.

Burns

A burn is an injury or destruction of the skin or deeper tissues caused by dry heat, chemical agents, or electricity. Scald is the same kind of injury, differing from a burn by being produced by hot vapors or hot liquids. Burns covering a small area usually cause no great difficulty other than the immediate pain and discomfort. Extensive burns, especially those covering more than $1/2$ of the body surface are likely to be followed by death. This is said to be due to the destruction of the nerves in the skin which govern the production and elimination of heat, also to internal congestion, and occasionally to ulcerations in the internal organs. These latter, however, are the later results. Ulcerations following burns are not uncommon in the stomach and intestines. Sometimes the immediate shock of a severe burn is the chief factor in the production of death. According to their degree, they are classified as burns of the first, second, or third degree.

1. *First degree*—simple redness or inflammation of skin.
2. *Second degree*—inflammation, accompanied by the formation of blebs or vesicles.
3. *Third degree*—charring and destruction of the skin and deeper tissues.

The treatment of burns differs according to the degree. For burns of the first and second degree the treatment is very much the same, but third degree burns should always be treated by the physician, as it is often necessary to trim out charred tissue and later to remove sloughing portions. In the case of the burns in the first degree, almost anything that produces an impervious covering of the surface, is sufficient. This prevents the entrance of air, and so aids in relieving the pain. It is hardly advisable to immerse the part in cold water even tho this does afford immediate relief, as pain is usually intensified on removal and lasts longer than if it had been immersed in hot water or some other application made. Vaseline, carron oil, and ointment, usually afford relief; also the application of bicarbonate of soda or flour; picric acid may also be used. In the burn of the second degree and in extensive burns of the first degree, the following is the plan now employed by the majority of physicians:

First fan the part until the serum has dried on the surface. Blebs should be punctured at their dependant edges with a

sterile needle, the raised epidermis being allowed to fall back and dry on the skin. Next apply, by means of cotton or gauze, a saturate aqueous solution of *picric acid*. This should be applied so as to cover the entire surface, and the part again be fanned or otherwise dried. Next cover by very light dusting with *stearate of zinc*. This should be very lightly done so as not to leave an amount which will favor the formation of cakes or crusts. In case the area involved is small, it will do no harm to apply a saturate solution of picric acid in 50–70 % alcohol. But the alcoholic solution should never be applied to an extensive area, as it may be absorbed and cause poisoning. However, the aqueous solution almost never produces any harmful results, even tho applied where the epidermis has been entirely removed.

This so-called dry method of treating burns is to be most highly recommended. Successive dressings are carried out in the same manner. The chief item to be observed is the keeping of the surface perfectly dry. This in itself favors the growth of epithelium, and the picric acid also stimulates the formation of epithelium. This general plan should be digressed from only in case of infection. If pus forms on the surface it is necessary to apply a compress wet in a very weak solution of some antiseptic for a few hours or a day or so. It is then usually best to return to the dry dressings. Where it is necessary to follow other methods of procedure, the directions of the physician should be very carefully followed in case the dressings are left to the care of the nurse. Burns of the third degree should be under the constant supervision of the physician. In many cases, however, the same general plan may be followed as for burns of the second degree.

General items. If clothing sticks to a burn, do not pull it off, taking a part of the skin surface with it; but loosen it by moistening with salt solution. Use a dressing that will exclude the air and prevent friction. Do not use a dressing that will stick in cakes as flour and cotton batting.

When the clothes are on fire, the wearer must not run about as this fans the flames. Have him lie on the floor and wrap in blankets, rugs, or anything that will smother the flames. In burns of the fingers, bandage each separately, as otherwise they may grow together.

swelling, local tenderness, and at its onset, often by chills. An abscess is always to be treated by a physician, where one is accessible. After it has been opened and surgically cared for, the dressings are much the same as in the treatment of boils or ulcers. In many cases, however, surgeons desire to irrigate abscess cavities. The antiseptic solution used should be very weak, so as to give rise to no danger from the absorption of chemicals. The general condition of the patient should be looked after by means of simple diet, tonic hydrotherapy, fresh air, attention of the bowels, etc.

HEMORRHAGES

Hemorrhage from veins is generally slow and steady, and the blood dark red. To stop hemorrhage, exert firm continuous pressure both above and below the wound. In arterial hemorrhage the blood is bright red and comes in spurts. Pressure should be exerted over the artery between the cut and the heart. Capillary hemorrhage is always present in every cut. The color of the blood is bright red, the flow is slow and scanty.

1. *Finger or toe.* Grasp the part tightly between your thumb and finger, making firm pressure against the bone at the sides.

2. *Arm or leg.* Place a small pad over the bleeding artery; by means of a handkerchief or firm strip of cloth, tie a bandage about the limb, drawing it tighter by inserting a stick and twisting the bandage.

To stop a hemorrhage from the brachial artery, make firm pressure over this artery at the inner side of the biceps muscle.

To compress the axillary artery, grasp the arm just below the shoulder with both hands. With the fingers in the axilla, press firmly against the upper end of the humerus.

To stop hemorrhage from a large artery in the leg, make firm pressure in the center of the popliteal space.

To compress the femoral artery, exert pressure just below Poupart's ligament, $\frac{1}{3}$ of the distance from the pubes to the spine of the ilium.

3. *Neck.* In arterial hemorrhage about the neck, make deep pressure at the side of the middle line just above the collar

bone. This will press the carotid artery back against the spinal column.

4. *Face.* Exert direct pressure over the wound or press the facial artery against the lower jaw bone. It will be found just in front of the angle of the jaw. For scalp wound, apply ice or very hot water directly to the wound itself.

EPISTAXIS

Snuff very cold water, salt and water, or a solution of alum (dessert spoonful to the half pint of hot water). Hold the arms up over the head, apply ice to the back of the neck and over the nose, and have the patient hold his hands in cold water or on a piece of ice. Where hemorrhage does not respond to other measures, it may be necessary to plug the anterior and posterior nares with cotton. This requires special skill, and is usually to be carried out by a physician.

HEMORRHAGE AFTER TOOTH EXTRACTION

Plug the cavity with small pledget of cotton dipped in adrenal solution, a solution of alum, or vinegar.

HEMATEMESIS

In hemorrhage from the stomach, blood is usually dark and has the appearance of coffee grounds. If the hemorrhage is very profuse and the vomiting immediate, the blood may be bright red. The cause is usually cancer or ulcer of the stomach.

Treatment,—

1. Keep quiet in recumbent position.
2. Ice bag over the stomach.
3. May swallow bits of ice.
4. Heat to feet.
5. Notify physician.

HEMOPTYSIS

In hemorrhage from the lungs the blood is bright red in color and frothy. The most common cause is tuberculosis. Other causes are strain, lifting, congestion of the lung.

DIFFERENCES IN—

HEMOPTYSIS

1. Pain in chest.
2. Blood frothy, alkaline.
3. Bright red.
4. Mixed with phlegm.
5. Coughed up.
6. Difficult breathing.

HEMATEMESIS

1. Tenderness over stomach.
2. Not frothy, acid.
3. Dark red.
4. Mixed with food.
5. Vomited up.
6. Nausea.

HEMORRHAGE FROM THE BOWELS

Hemorrhage from the bowels may be caused by hemorrhoids, typhoid fever, tuberculosis, cancer, ulcer, and many other conditions. In hemorrhage from the upper bowel the blood is usually dark and mixed with feces. In hemorrhages from the rectum, the blood will be passed by itself or may coat the feces.

Treatment, —

1. Cold to abdomen.
2. Heat to limbs.
3. Quiet and absolute rest.
4. Notify the physician.

SPRAINS

A sprain is due to the tearing or rupture of ligaments. It is most frequently in the ankles. As far as possible the part should be kept at rest for a few days. The alternate hot and cold foot bath is an excellent means of preventing undue swelling and of relieving the pain. The flowing cold foot bath may be used. Continuous heat, such as the hot foot bath or fomentation, is usually never as efficient as the measures just recommended. Bandaging the part only prevents swelling without in any wise overcoming the cause of the swelling.

FRACTURES

Fracture is the breaking of a bone. The following varieties are distinguished: Simple, comminuted, green stick, and compound or open fracture.

Comminuted fracture is one in which the bone is splintered, several small pieces being formed.

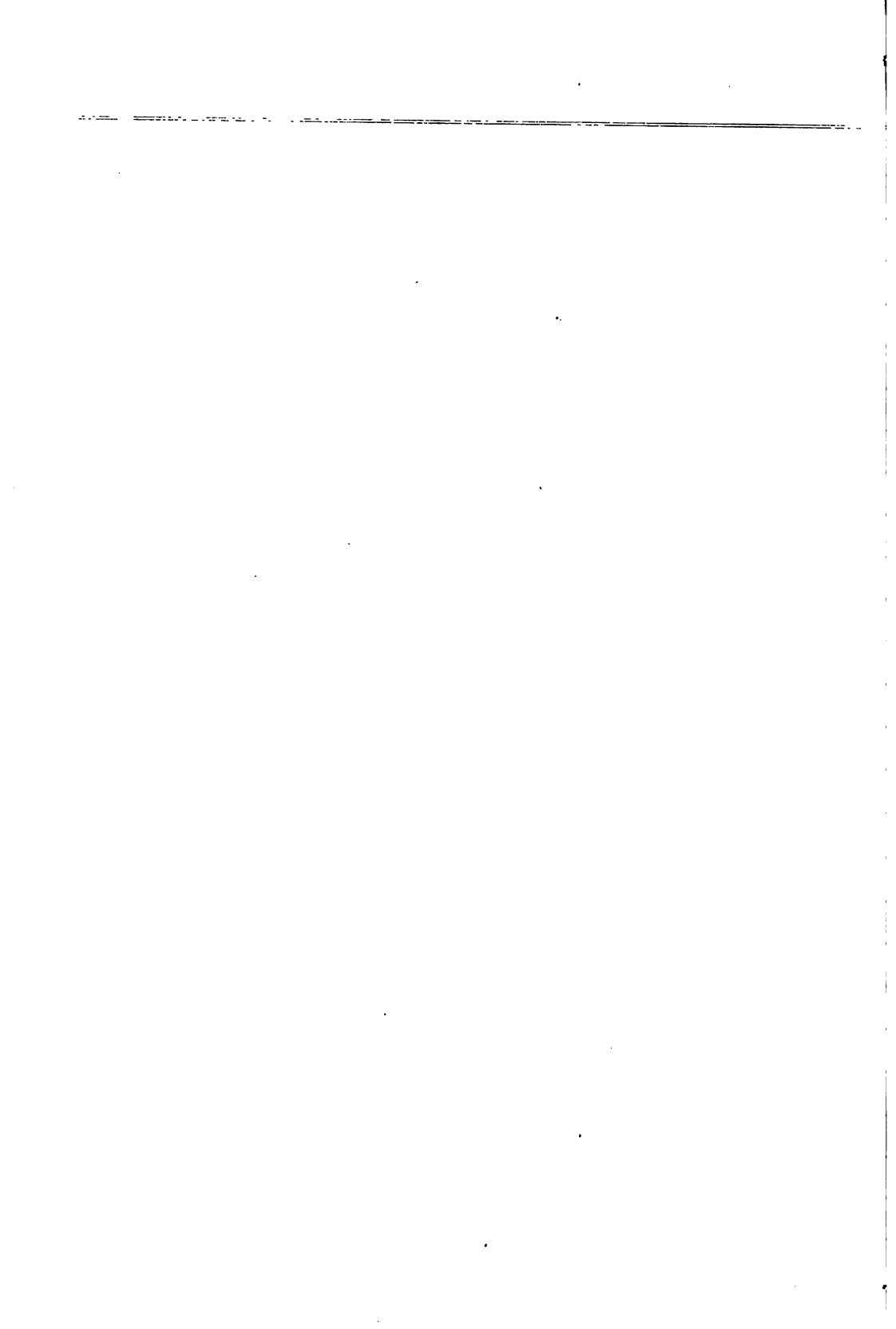
Green stick fracture usually occurs in the bones of children. It is a partial break, usually without displacement, — in much the same way as a green stick breaks when bent.

Compound or open fracture is one in which there is an opening from the skin or the mucous membrane down to the seat of fracture. Because of the opportunity for the entrance of germs, infection is very likely to take place.

Treatment, —

In the case of fracture, that which frequently devolves upon a nurse is treatment to relieve the pain while awaiting for the arrival of the physician. The relief of the pain and the relaxation of the muscles is best accomplished by the use of the fomentation. This should be applied as hot as can be borne, care being taken that a burn is not produced.

In case of compound fracture, the break in the skin should be thoroly cleaned and any dirt or foreign matter picked out. If the ends of the bone protrude, it is well to leave them until the physician arrives; at least they should not be replaced until the parts have been thoroly disinfected.



PART III

SOLUTIONS

CHEMICALS IN COMMON USE

Corrosive Sublimate (HgCl_2)

1. *Properties.* Strength of saturation: 1 part of bichloride made up with cold water 16 parts. An equal amount of common salt added to the bichloride will hasten its solution. The addition of HCl or citric acid aids its disinfectant action.

Bichloride corrodes instruments. It is not a good disinfectant for clothing as it stains white materials yellow.

It is decomposed by alkalies and is precipitated by albumen.

2. *Solutions.* Solutions of this drug varying from 1—500 to 1—10,000 are used. Those most often employed are 1—500, 1—1000, and 1—2000.

The weaker solutions are used for irrigating cavities. As an absolute disinfectant, solutions weaker than 1—1000 should not be used.

It is not an efficacious disinfectant for stools, bloody or purulent discharges as it hardens albumen, forming a coat or shell within which germs retain their vitality.

Carbolic Acid ($\text{C}_6\text{H}_5\text{OH}$)

1. *Properties.* Strength of saturation: 1 part of acid to 15 parts water. However, the standard solution for ward use is made with 20 parts of water.

It is a product derived from coal tar by distillation. Chemically it is not an acid but a phenol. The pure acid is colorless. If 5% water is added to the melted crystals, the solution will not re-crystallize. Carbolic acid is freely soluble in glycerine, alcohol, and ether.

2. *Solutions.* All solutions are preferably made with hot water to insure the thoro dissolving of the globules, as these

are very corrosive. The solutions in common use are 1—20 (5%), and 1—40 (2 1/2%). Solutions weaker than 5% will not destroy all germs, but because of its irritating qualities it can not always be used that strong.

It does not discolor instruments or clothing. Long continued submersion in the pure acid will deprive knives and scissors of their temper and edge. Five minutes in the pure acid is sufficient to insure thoro disinfection. Clothing should stand at least 1 hour in a 5% solution.

The odor of carbolic may be covered by using oil of peppermint or cinnamon.

Lysol

1. *Properties.* Full strength or (100%) solution. It is a coal tar product, brown, oily, saponified liquid, containing about 50 of cresols. It is less poisonous than carbolic acid.

2. *Solutions.* Solutions are used from 1—5%. Those in most common use range from 1/2%—2%. It may be used for the disinfection of anything in the sick room except rubber goods that must stand in the solution a long time, as it softens the rubber.

Creolin

1. *Properties.* Full strength (100%) solution. A black, syrupy liquid. When mixed with water forms an opaque emulsion, which is a disadvantage in the disinfection of instruments, since they can not easily be found in it.

It is not so poisonous as carbolic acid.

2. *Solutions.* 1%—5% are used. For cleansing hands a 5% solution is generally used. For vaginal irrigation a 1% solution is used.

Formaldehyde (CH₂O)

1. *Properties.* A colorless gas with a strong, pungent irritating odor. It is very irritating to the mucous membranes and skin. Readily soluble in water. Formalin is an aqueous solution containing about 40% of the gas. It is a good deodorizer. Used very extensively for the fumigation of rooms. Ammonia will destroy the odor. Its antiseptic properties are considered superior to bichloride of mercury. It does not corrode or tarnish metal or injure fabrics.

2. *Solutions.* All aqueous solutions are made from formalin. Cold water should be used, as heat evolves gas, weakening the solution.

For the disinfection of colon tubes or lavage tubes, use a 1% solution and allow to stand at least one-half hour.

For rubber irrigating points or articles to be used in an operating room, a 5% solution should be used and the immersion continued for about one hour.

Potassium Permanganate

1. *Properties.* Strength of saturation, 1—16. The crystals are dark purple, slender prisms, inodorous. Solutions not made with distilled water are likely to deteriorate, especially if exposed to the light.

2. *Solutions.* It is used in varying strengths from 1—16 to 1—5000.

For hands, use a saturated solution. In weaker solutions it is used on wounds, especially those having an offensive discharge. A 1—1000 solution may be used for gargles, douches or sprays.

It is not useful in disinfecting excreta, as the amount required to make it effectual would be a great expense.

Boracic Acid (H_3BO_3)

1. *Properties.* Strength of saturation, about 1—25. The crystals are pearly white and glistening, and non-irritating.

2. *Solutions.* It is much used in ophthalmic and aural practice, also for superficial wounds and bladder irrigation. As a wash for the eyes, a 2% solution is commonly used.

Oxalic Acid ($\text{C}_2\text{H}_2\text{O}_4, 2\text{H}_2\text{O}$)

1. *Properties.* Strength of saturation, about 1—10. The crystals are colorless and four sided. They closely resemble in appearance those of magnesium sulphate and zinc sulphate. It is a powerful germicide, and very irritating. It removes the stain of potassium permanganate.

2. *Solutions.* The saturate solution is used for hand disinfection. Oxalic acid is never used for irrigating cavities, as it is highly toxic.

Salt (NaCl)

1. *Properties.* Strength of saturation, 1—2 1/2. Exists in

the blood in the strength of 6/10%. Water alone is an irritant to abraded tissue, but a weak solution of salt makes it non-irritant.

2. *Solutions.* The solution most commonly used is the normal or physiologic saline solution. It is so-called because it approximates the density of blood serum. To make this, use one of the following formulae:—

(a) 6 grams of salt to 1000 c.c. of water. (b) 1 tsp. of salt 1 pt. of water. (c) 15 c.c. saturated solution to 1000 c.c. of water.

Alum ($\text{KAl}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$)

1. *Properties.* Strength of saturation, 1—9. It is an astringent and styptic.

2. *Solutions.* The saturated solution is often used to arrest uterine hemorrhage or profuse flowing by giving a vaginal irrigation at a temperature of 120° F.

Alcohol ($\text{C}_2\text{H}_5\text{OH}$)

1. *Properties.* A colorless, volatile liquid of an agreeable odor and burning taste. It is a solvent for many substances. Mixes with water in all proportions.

2. *Solutions.* Grain alcohol, 95%; proof spirit, 50%.

Peroxide of Hydrogen (H_2O_2)

1. *Properties.* Slightly acid, watery solution of hydrogen dioxide, containing when fresh about 3% the pure dioxide, corresponding to about 10 volumes of oxygen. It is an antiseptic, deodorant and styptic. Its value depends upon the liberation of oxygen. When poured into a wound, effervescence takes place which carries off any tissue shreds that can not be easily reached. It should not be relied upon as a disinfectant.

It must be kept in a cool, dark place, and readily decomposes on coming in contact with metals.

2. *Solutions.* Used for (1) gargles, (2) irrigating wounds or ulcers where pus is present.

It is a direct antagonist of the tetanus germ, since the latter can not live in the presence of oxygen.

Sodium Bicarbonate (NaHCO_3)

1. *Properties.* Strength of saturation, 1—12. It is commonly called baking soda.

2. *Solutions.* A 1% solution is used in which to boil instruments.

Sodium Carbonate (Na_2CO_3)

1. *Properties.* Strength of saturation, 1—2. Transparent, colorless crystals, which break down into a white powder on standing (effloresce). This chemical is commonly called sal soda, or washing soda. It will remove the stains made by bichloride of mercury on china or glass.

Chlorinated Lime (Chloride of Lime)

1. *Properties.* Made by the action of chlorine on slacked lime. It contains about 35% of available chlorine. It should be used fresh as its disinfectant properties are due to the action of chlorine.

2. *Solutions.* The standard solution contains 6 ounces to the gallon of water (4%). It is a good disinfectant for feces, sputum, or urine.

Iodoform (CHI_3)

1. *Properties.* It has no decided antiseptic properties. It is useful because it inhibits the growth of bacteria and thus prevents decomposition. When applied to raw surfaces it is occasionally absorbed into the system, causing symptoms of poisoning. Spirits of turpentine will remove the disagreeable odor of the drug. It darkens upon exposure to a bright light, and is likely to cake when it becomes moist.

2. *Preparations.* It is used for impregnating gauze dressings, for dusting on ulcers or wounds. Dissolved in ether or olive oil is often injected into sinuses or tubercular abscesses, and is an ingredient of bone wax used for filling cavities in bone.

Argyrol

1. *Properties.* Strong, non-irritating and non-toxic disinfectant. Stains may be removed by immersion in 1—500 HgCl_2 .

2. *Solutions.* Better results will follow the use of freshly prepared solutions. In cystitis, or an irritable bladder, one ounce of 10—25% is injected and allowed to remain in the bladder. It is used in ophthalmic surgery quite extensively. Is also palliative or curative in many diseases of the rectum.

THE METRIC SYSTEM

The metric system is employed almost universally in Europe, and it is being rapidly adopted in America. Because of its simplicity, it greatly facilitates the calculations incident to the making up of solutions. The unit of length is called the meter—(39.37 in.). The subdivisions of the meter are expressed by Latin prefixes while the multiples are designated by Greek prefixes. The two arrangements are as follows:—

DECREASING SCALE

Meter.

Decimeter—one-tenth ($1/10$) of a meter.

Centimeter—one-hundredth ($1/100$) of a meter.

Millimeter—one thousandth ($1/1000$) of a meter.

INCREASING SCALE

Meter.

Dekameter—ten meters.

Hectometer—hundred meters.

Kilometer—one thousand meters.

The cube of a centimeter is called a cubic centimeter (c.c.).

The unit of capacity is called a liter, and is equivalent to 1000 c.c.

The unit of weight is called a gram, and is equivalent to the weight of 1 c.c. of distilled water at 4° C.

The same prefixes used for the meter are used for the liter and gram to denote their division and multiplication. However, in the case of the liter the divisions are rarely spoken of as deciliter, centiliter, etc., but are generally designated 100 c.c. instead of deciliter, 10 c.c. instead of centiliter, etc.

APPROXIMATE EQUIVALENTS

1 meter	39.37 in.
25 millimeters (mm)	1 in.
1 liter	33.81 fluid ounces or about 2 pts.
30 c.c.	1 fluid ounce.
4 c.c.	1 dram.
5 c.c.	1 teaspoonful.
1 c.m.	$2/5$ in.
1 gram	15 $1/2$ gr.
1 grain065 gm.
1 kilometer	$3/5$ mile.
1 kilogram	2 $1/5$ pounds, avoirdupois.

The United States nickel (five cent piece) weighs 5 grams, and is 2 centimeters in diameter.

PREPARATION OF SOLUTIONS

LESSON I.

Coal Tar Products

Full strength (100%) chemicals: lysol, carbolic, creolin, creosote.

Carbolic acid in liquid form is 95% but is always used as tho it were 100%, as the difference is so slight. In making up full strength solutions, it is a good plan to use a liter (1000 c.c.) as a starting point. Since 1% of 1000 c.c. is 10 c.c., from this any quantity and any per cent can readily be estimated.

Problems

One. Make up 1 liter of 2% lysol.

1 liter=1000 c.c.

1% =1/100 of 1000 c.c. or 10 c.c.

2% =2×10 c.c. or 20 c.c., the amount of lysol it takes to make 1 liter of 2% solution.

Two. How many c.c. of creolin does it take to make a liter of 1/2% solution?

1 liter=1000 c.c.

1% =1/100 of 1000 c.c. or 10 c.c.

1/2% =10 c.c. ÷2, or 5 c.c., the required amount.

Three. Disinfect 2 liters of sick room discharges with carbolic acid, using sufficient to make a 5% solution.

1% of 1000 c.c. (1 liter)=10 c.c.

5%=5×10 or 50 c.c., the amount of carbolic it would take to make 1 liter of a 5% solution.

To make 2 liters it would take 2×50 c.c. or 100 c.c. (3 1/3 oz.) of carbolic acid.

Four. Make up 1 pt. of 2% lysol.

1 liter=1000 c.c.

1% of 1000 c.c.=10 c.c.

2%=2×10 or 20 c.c., the amount of lysol to make 1 liter of 2% solution.

A pint=1/2 liter, thus 20 c.c. ÷2=10 c.c. (3 iiss) the amount of lysol required to make 1 pint of solution.

LESSON II.

Formaldehyde Solutions

All formaldehyde solutions are made from formalin which is 40% formaldehyde.

1% = $1/100$ or in 100 parts, 1 part is the chemical.

2% = $2/100$ ($1/50$) or in 100 parts, 2 parts are the chemical.

There is one part of the chemical to every 50 of water.

4% = $4/100$ ($1/25$) or in 100 parts 4 parts are of the chemical. Thus in every 25 parts of water there is one of the chemical, making a solution of 1—25 which is equivalent to 4%.

5% = $5/100$ or 1—20.

6% = $6/100$ or 1—16 $2/3$.

10% = $10/100$ or 1—10.

40% = $40/100$ or 1—2 $1/2$.

50% = $50/100$ or 1—2.

Thus we see that formalin (40%) is a 1—2 $1/2$ solution. It takes 2 $1/2$ c.c. of the solution to contain 1 c.c. of the chemical. Thus in making up solutions from formalin it takes 2 $1/2$ times as much as it would to make up a solution from a chemical that is full strength.

Problems

One. Make up 1 liter of 1% formaldehyde.

1% of 1000 c.c. = 10 c.c., full strength.

10 c.c. \times 2 $1/2$ = 25 c.c., the quantity of formalin it requires to make a liter of a 1% solution, thus we deduce the following rule:—

“To make up solutions from formalin, proceed just as in full strength solutions, multiplying the results by 2 $1/2$.”

Two. How much formalin will it take to make 2 liters of 1/2% solution?

1 liter = 1000 c.c.

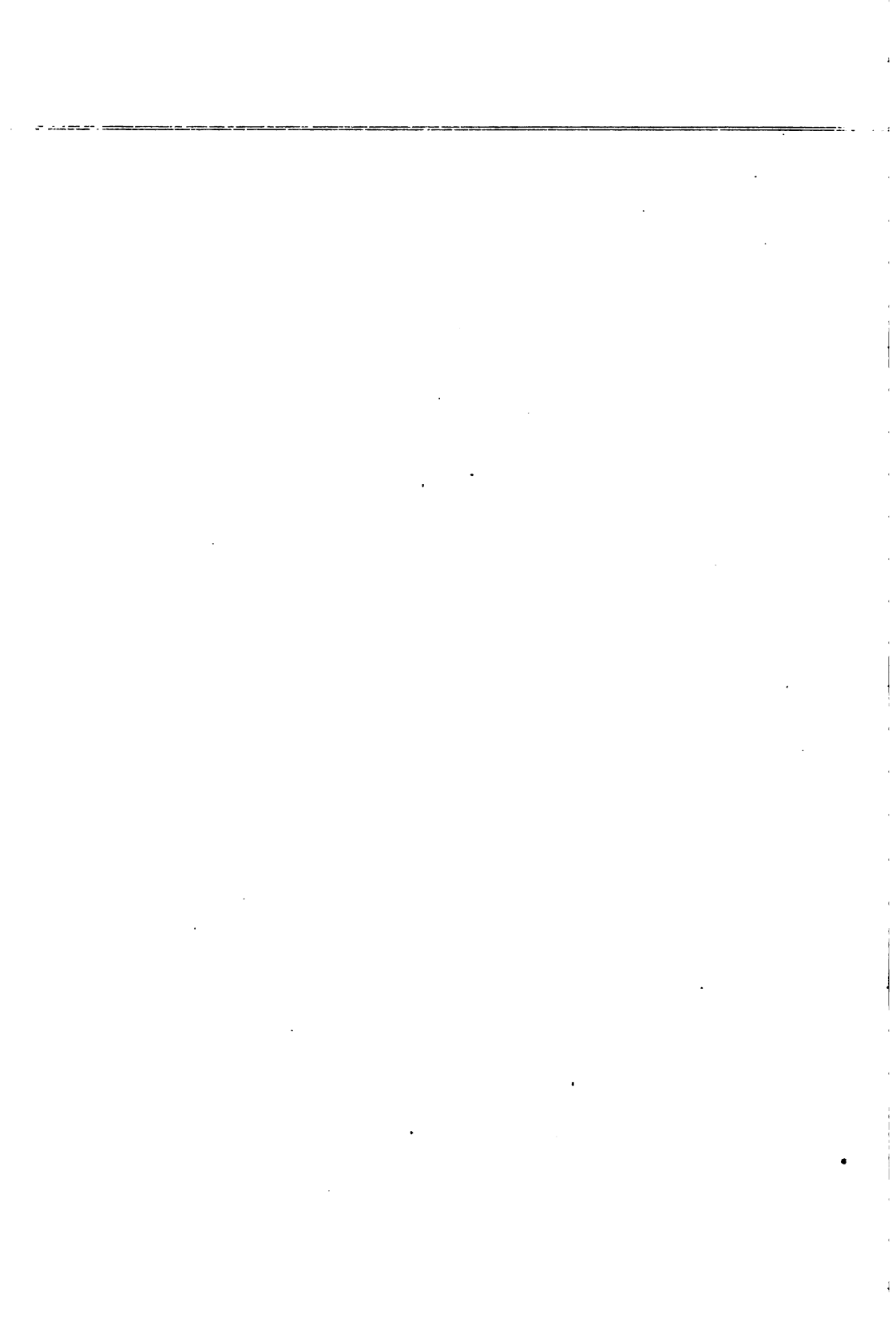
1% = $1/100$ of 1000 c.c. or 10 c.c.

1/2% = $10 \text{ c.c.} \div 2$, or 5 c.c. for 1 liter.

2 liters = $2 \times 5 \text{ c.c.}$, or 10 c.c. of full strength.

10 c.c. \times 2 $1/2$ = 25 c.c., the amount of formalin required to make 2 liters of 1/2% solution.

11



LESSON III.

Bichloride of Mercury (HgCl_2)

Solutions of bichloride of mercury may be made up from the following:—

1. Tablets.
2. Saturated solution.
3. Stock solutions.
4. Crystals.

The nurse should familiarize herself with every form of a chemical and in making up solutions she should be able to utilize whichever form may be at hand. Each of the above will be considered separately.

No. I., Tablets

The two most common forms of tablets are those containing 7.3 gr. and those containing 1.8 gr.

7.3 gr. ($1/2$ gm. approx.) to aqua $1/2$ liter (1 pt.) = 1—1000 HgCl_2 . 4 of the small tablets are equivalent to one of the large ones containing (7.3 gr.). The advantage of the smaller tablets can readily be seen in the making of weak solutions, as otherwise the large tablets would have to be divided (this is inaccurate) or else there will be quite a waste.

1 tab. (7.3 gr. or $1/2$ gm.)	to aq. $1/2$ liter or 1 pt	= 1—1000.
2 “ (14.6 “ “ 1 “)	“ “ 1 “ “ 2 “	= 1—1000.
1 “ (7.3 “ “ $1/2$ “)	“ “ 1 “ “ 2 “	= 1—2000.
$1/2$ “ 2 sm. tab.	“ “ 1 “ “ 2 “	= 1—4000.

Problems

One. Make up 5 liters of 1—1000 HgCl_2 , using the large tablets.

1 tab. to $1/2$ liter = 1—1000.

2 tab. to 1 liter = 1—1000.

5 liters = 2 tab. $\times 5$ or 10 tablets, the number of tablets required.

Two. Make up 2 liters of 1—4000 using the small tablets.

4 sm. tablets to $1/2$ liter = 1—1000.

2 “ “ “ 1 “ = 1—4000.

2 tab. $\times 2$ = 4 sm. tab., the number required for 2 liters of 1—1000.

- Three.** Make up 3 liters of 1-500 from the large tablets.
 To make 1 liter of 1-1000=2 large tablets.
 To make 1 liter of 1-500 =4 large tablets.
 To make 3 liters of 1-500 =4×3 or 12 tablets.

LESSON IV.

Bichloride of Mercury*No. II., Saturated Solution*

Bichloride of mercury saturates at 1-16. By this we mean that every 16 c.c. of water contains 1 gm. of the chemical.

In making up solutions from the saturated solution always find first of all how many grams of the chemical will be needed, then if 16 c.c. of the sat. sol. is equivalent to 1 gm., the amount needed can easily be calculated and measured.

Problems

One. Make up 2 liters of 1-1000 HgCl_2 from the saturated solution.

To make 1 liter of 1-1000 requires 1 gm. of the chemical and to make 2 liters, 2 gms. would be necessary.

If 1 gm. of the chemical is equivalent to 16 c.c. of the sat. sol., 2 gms. would equal 32 c.c., or $\frac{3}{4}$ j, the amount of sat. sol. required.

Two. Make up 3 liters of 1-4000 from the sat. sol.

To make 1 liter of 1-1000=1 gm.

“ “ 1 “ “ 1-4000= $\frac{1}{4}$ gm.

“ “ 3 “ “ 1-4000= $\frac{3}{4}$ gm.

$\frac{3}{4}$ of 16 c.c.=12 c.c. ($\frac{3}{4}$ j) of sat. sol.

LESSON V.

Bichloride of Mercury*No. III., Stock Solutions*

A stock solution is a solution of a certain per cent that is always kept on hand to be used in making up weaker solutions. The most common stock solutions are 1-20 and 1-40.

A 1-20 solution signifies that every 20 c.c. of the solution contain 1 gm. of the chemical. The same method is used in making up solutions from stock solutions that is observed in using the saturated solution.

Problems

One. Make up 2 liters of 1—3000 HgCl_2 from the stock solution 1—20.

1 liter of 1—1000 takes 1 gm.

1 “ “ 1—3000 “ $1/3$ gm.

3 “ “ 1— 300 “ $3 \times 1/3$ or 1 gm.

Since 1 gm. is equivalent to 200 c.c. of the stock solution, just 20 c.c. will be needed.

Two. Make up 4 liters of 1—2000 from the stock sol. (1—40).

1 liter of 1—1000 takes 1 gm. of crystals.

1 “ “ 1—2000 “ $1/2$ “ “ “

4 “ “ 1—2000 “ $4 \times 1/2$ or 2 gms.

1 gm.=40 c.c. of stock sol.

2 “ = 2×40 or 80 c.c. stock sol.

No. IV., Crystals

In using the crystals to make up solutions it is necessary to weigh them. This is often inconvenient, so when the nurse is given crystals she generally makes up a sat. sol. and uses that. However, a few problems will be given to demonstrate the method of calculating the amount of crystals needed.

Problems

One. Make up 6 liters of 1—500.

To make up 1 liter of 1—1000=1 gm.

“ “ “ 1 “ “ 1— 500=2 gm.

“ “ “ 6 “ “ 1— 500= 6×2 or 12 gm.

As the nurse very seldom has access to the metric scales, it is necessary to convert the amount needed into the avoirdupois equivalent, hence,

1 gm.—15 $1/2$ gr.

12 gm.—15 $1/2$ gr. $\times 12$ or 186 gr. (approx. 3ij as there are 60 gr. to 3j .)

Two. Make up 3 liters of 1—5000 HgCl_2 .

1 liter of 1—1000=1 gm.

1 “ “ 1—5000= $1/5$ gm.

3 “ “ 1—5000= $3/5$ gm.

$3/5$ of 15 $1/2$ gr.=9 gr. (approximately).

LESSON VI.

Potassium Permanganate (KMnO_4)

As the strength of saturation of potassium permanganate is the same as bichloride of mercury, its solutions are made up in the same way. The only difference being in the size of the tablets. The tablets of potassium permanganate most commonly used are the 1 gr. or the 5 gr. So if the amount of the crystal needed is estimated in grams, it can quickly be converted into grains, and then the number of tablets may be easily estimated.

Boracic Acid (H_3BO_3)

Strength of saturation=1—25, or 4%.

Problems

One. Make up 6 liters of 3% from the crystals.

To make 1 liter of 1% (1—100)=10 gm.

“ “ 1 “ “ 3% “ =3×10 or 30 gm.

“ “ 6 “ “ 3% “ =6×30 or 180 gm.

30 gm.=1 ounce.

180 gm.=6 ounces.

Two. Make up 4 liters of 2% from the sat. sol.

1 gm. of crystal—25 c.c. of sat. sol.

To make 1 liter of 1% (1—100)=10 gm.

“ “ 1 “ “ 2% “ =2×10 or 20 gm.

“ “ 4 “ “ 2% “ =20×4 or 80 gm.

25 c.c.×80=amount of sat. sol. or 2000 c.c. (2 l.).

Three. Make up 1 liter of 1% from the sat. sol.

To make 1 liter of 1%=10 gm.

25 c.c.×10=250 c.c. of sat. sol. (1/4 liter).

LESSON VII.

Salt Solutions

Strength of saturation=1—2 1/2, or 40%.

The solution of salt most commonly used is the normal saline or 0.6%, so called because it contains the same amount of salt as blood serum.

Problems

One. Make up 3 liters of normal saline from the sat. sol.

To make 1 liter of 1—100 (1%) = 10 gm.

“ “ 1 “ “ 6/10% = 6/10 of 10 or 6 gm.

Since 2 1/2 c.c. of sat. sol. is equivalent to 1 gm., 6 gms. would = $6 \times 2 \frac{1}{2}$ or 15 c.c. of sat. sol. to 1 liter.

3 liters would equal 3×15 or 45 c.c. (1 1/2 oz.).

Two. Make up 4 liters of normal sol. from the crystal.

1 liter = 10 gm, salt for a 1%.

1 “ = 6/10 of 10 gm. salt or 6 gm. for 6/10%.

6 gm. $\times 10 = 24$ gm. (4/5 oz.) amount required.

There are also saline tablets of varying strength on the market, but full directions for their use are always found on the label.

Cocain Solutions

In making up cocain solutions the use of the metric system is not practical for the following reasons:—

1. Solutions are often made from the crystals, which must be weighed and the metric weights are not commonly used.

2. The solution is used in small quantities so that it is easier to calculate in grains than in grams.

All cocain solutions are made with cold water.

Problems

One. Make up 1 oz. of 1% cocain from the crystals.

480 gr. = 1 oz.

1% of 480 = $1/100$ of 480 or 4.8 gr. amount required.

Two. Make up 3 dr. of 1/2% cocain from 1/2 gr. tablets.

480 gr. = 1 oz.

60 gr. = 1 dr.

180 gr. = 3 dr.

1% of 180 gr. = 1.8.

1/2% = $1.8 \text{ gr.} \div 2 = 0.9 \text{ gr.}$

0.9 gr. = 2 tabl. approx.

Three. Make up 2 oz. of 1% sol. from the crystals.

480 gr. = 1 oz.

960 gr. = 2 oz.

1% of 960 gr. = 9.6 gr. amount required.

How to make cocain solutions from a 4% sol. —

1% = $1/4$ of 4%.

2% = $1/2$ “ “

3% = $3/4$ “ “

Problems

One. Make up $1\frac{1}{2}$ oz. of 2% cocain.

$1/2$ of $1\frac{1}{2}$ oz. = $1/4$ oz. or 3ii . Hence it would take 3ii of 4% cocain and 3ii of aqua.

Two. Make up 3ii of 3% cocain.

3ii = 8 c.c.

$3/4$ of 8 c.c. = 6 c.c., amount of 4% cocain required.

Add to this 2 c.c. of aqua.

The underlying principles to be observed in the making of all solutions may be briefly summed up as follows:—

1. In making up a solution from a chemical in the liquid form, first find how many c.c. of the full strength chemical are required for 1 liter of 1%, and if that is understood thoroly, any strength can be easily and accurately computed from that.

2. In making up a solution from the chemical in the crystalline form, first determine how many grains will be required to make 1 liter of either 1—100 or 1—1000, whichever is most convenient, depending largely upon the chemical used.

3. All solutions from chemicals in common use are made with *hot* water, except cocain and formaldehyde.

INDEX

References are to the pages.

- Abscesses, 96
- Accidents and minor surgery, 90-100
- Administration of medicine, 35
- After-Treatment, 76-89
- Alcohol, 104
 - poisoning from, 52
- Alum, 104
- Anesthetics, 73-75
 - poisoning from, 52
- Antidotes for poisons, 48-54
- Antipyretics, poisoning from, 52
- Argyrol, 105
- Arsenic poisoning, 49
- Aural douche, 24
-
- Beds and bed making, 12-30
- Bedside records, 7-11
- Bed sores, 43
- Belladonna, poisoning from, 52
- Bichloride of mercury, 109-111
- Bladder irrigation, 25
- Bleeding; see *Hemorrhage*
- Body temperature, 1-3
- Boils, 96
- Boracic acid, 103, 112
- Brushes, 65
- Burns, 94
-
- Carbolic acid, 101
 - poisoning from, 51
- Carbon monoxide, poisoning from, 52
- Carbuncle, 96
- Care of the dead, 39
- Cataplasms; see *Poultices*
- Catheterization and bladder irrigation, 25
- Caustic alkali poisoning, 51
- Changing bed linen, 14
- Chills, 47
- Chloral, poisoning from, 52
- Chlorinated lime, 105
- Chlorine poisoning, 49
- Coal tar, 107
 - poisoning from, 52
- Cocain, 113
 - poisoning from, 52
- Common emergencies, 45
- Complications, surgical, 81
- Contusions, 90
- Copper poisoning, 49
- Corrosive poisons, 51
- Corrosive sublimate, 101
- Croton oil poisoning, 49
- Creolin, 102
- Cystitis, 86
-
- Dead, care of the, 39
- Diet, 32-34
 - before operations, 57
- Digitalis, poisoning from, 53
- Dishes and utensils, 68
- Disinfection, 63
- Douche, preparation for, 16
- Dressings, 66
- Drowning, 46
- Duties of staff, 62
-
- Emergencies, common, 45
- Emetics, 48
- Enema, nutrient, 29
 - preparation for, 16
- Epilepsy, 46
- Epistaxis, 98
- Examination, full, 37
-
- Fainting, 45
- Feeding, nasal, 28
- Foods; see *Diet*
- Formaldehyde, solutions, 102, 108
 - poisoning from, 49
- Full examination, 37
-
- Gloves, 65
- Glycerine, 69
- Gunshot wounds, 92
-
- Hand disinfection, 63
- Hematemesis, 98
- Hemoptysis, 98
- Hemorrhage, 83, 97-100
- Hydrocyanic acid, poisoning from, 53
- Hypodermic injections, 24
- Hypodermoclysis, 87
- Hysteria, 46
-
- Incised wounds, 90
- Incompatibilities, 36
- Infection of wounds, 84, 93
- Infectious cases, general care of, 41
- Injections hypodermic, 24
- Instruments and supply room, 65
 - sterilization of, 68
- Intestinal obstruction, 86
- Intravenous saline infusion, 88
- Iodine poisoning, 49
- Iodoform, 105
 - gauze, 67
 - poisoning from, 53
- Irrigation of bladder, 25
- Irritant poisons, 49

INDEX

- Lacerated wounds, 91
- Lavage, 21
- Lead poisoning, 50
- Lifting the patient, 15
- Lysol, 102

- Medicine, administration of, 35
- Mercury poisoning, 50
- Methods of sterilization, 65
- Metric system, the, 106
- Mineral acids, poisoning from, 51
- Mouth washes, 47

- Nasal douche, 23
- Nasal feeding, 28
- Neurotic poisons, 52-54
- Nicotine poisoning, 53
- Normal salt solution, 69
- Nutrient enema, 29
- Nux vomica, poisoning from, 53

- Obstetrical bed making, 13
- Obstruction, intestinal, 86
- Operations, after-care of, 77
 - preparation for, 56-60, 71
- Operating room, the, 60
- Opium poisoning, 54
- Oxalic acid, 103
 - poisoning from, 51

- Packing, 67
- Peritonitis, 85
- Peroxide of hydrogen, 104
- Phosphorus poisoning, 50
- Pneumonia, 85
- Poisoned wounds, 92
- Poisons, 48-54
- Potassium permanganate, 103, 112
- Poultices, 31
- Preparation of patient, 56
 - of patients room, 17, 55
 - for douche and enema, 16

- Proctoclysis, 88
- Ptomain poisoning, 50
- Punctured wounds, 91
- Pulse, 3-6

- Records, bedside, 7-9
 - operative, 70
- Respiration, 6
- Room, preparation of, 17, 55, 71, 64
- Rubber gloves, 65

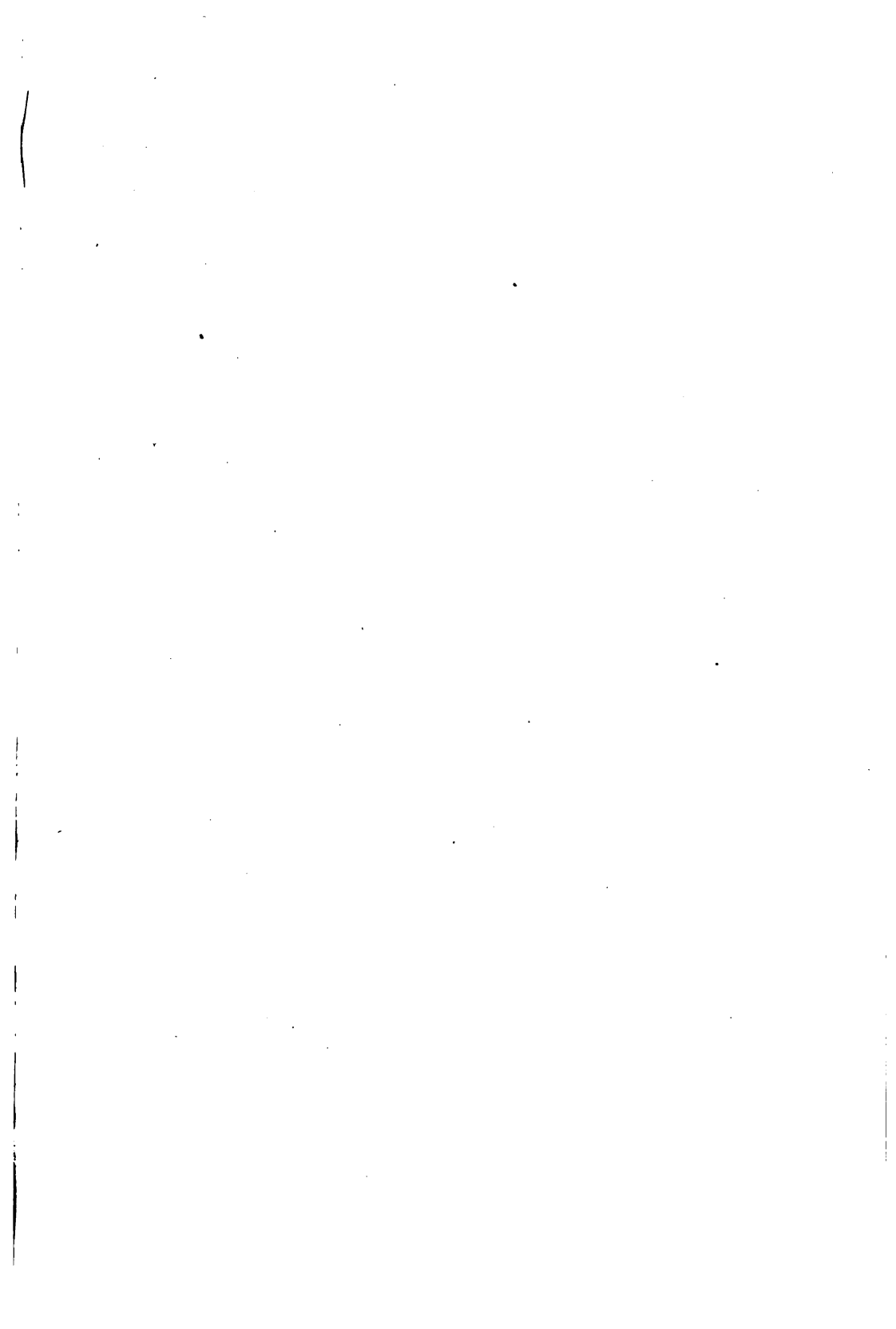
- Salt, 69, 103, 104, 112, 113
- Septicemia, 86
- Shock, 81-83
- Sick room, the, 17, 55
- Silver poisoning, 50
- Sodium carbonate, 105
- Sodium bicarbonate, 104
- Solutions, 69, 101-114
- Sordes, 47
- Sterilization, methods of, 65
- Sterilizing room, 64
- Surgical bed making, 12
 - complications, 81
 - room, how to clean, 18
 - nursing, 55-90
 - shock, 81-83
- Sutures, 66

- Technique of tables, 61
- Temperature; see *Body temperature*
- Test breakfast, the, 23

- Ulcers, 96

- Wheel chairs, 16
- Wound infection, 84
- Wounds, 90

- Zinc poisoning, 50



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